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"THE SIX MILLION DOLLAR MAN"
in a space adventure of the near future

CYBORG IV

by the author of
CYBORG, OPERATION NUKE and HIGH CRYSTAL

MARTIN CAIDIN

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CYBORG IV

BY MARTIN CAIDIN

Here is "The Six Million Dollar Man" in a space adventure of the near future in which Cyborg Steve Austin races against time and technology to protect U.S. Military security and his own life.

Bionics man Steve Austin is now linked symbiotically to his own space vehicle. During a supposed period of international détente, USAF recon-satellites monitering Russian military installations are made inoperative. Steve Austin, a literal man-spaceship by the process of symbiosis, is dispatched to define and remedy, by whatever means necessary, the sabotage.

Cyborg IV anticipates the launching of the joint Soyuz-Apollo mission projected for summer of 1975; it finds Cyborg Steve Austin back in space, flying *manned* spaceships; it adds the new concept of man-machine symbiosis, which is the dramatic concept behind manned space flight of the near future—and features the first fully qualified female astronaut, the specialist in the new *"project symbot."*

(Please see back flap)

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CYBORG IV

BY

MARTIN CAIDIN

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CHAPTER 1

He looked up at the woman with an expression of pain laced with hatred. The pain twisted his facial muscles into a grotesque mask. Pain, and a long-ago tearing of his body, continued the distortion along his neck, sinew-strained with its own blend of agony and effort. One shoulder hunched higher than the other, and, along the base of his neck, muscles clumped in braided cords, running from sight beneath his hair, glistening with the sweat that had been pouring from him. His arms were more gnarled, albeit powerful limbs, as his hands grasped the guide rails between which he stood awkwardly. His legs gave him little support, even though they were encased within leg braces reminiscent of an era when polio ravaged so many victims. No polio victim this man. He had been ripped and torn and stabbed and burned when his jet fighter snapped away a landing gear, sending the disintegrating machine on a short but terrifying swath of destruction that had disemboweled metal and ground into bloody hamburger the helpless man within.

That had been long months before. Months of intensive medical care, of deep and brooding depression, and the realization that whatever other injuries might be brought through healing, medical science still stood helpless beyond a certain savage circle—within which clustered, unable ever to stand or walk, those known as paraplegics. For a torn shard of metal, twisting away from the machine coming to pieces on the hard runway, had penetrated his flight suit and garments without resistance, and stabbed deeper within skin into the exquisitely engineered structure of his spinal column. And into the system of nerves and muscles binding it all together.

Simple enough. The spinal trunkline had been severed, and along with it the ability of the brain to flash its message to any point of his body below that terrible slash. His lower trunk and his legs had become stupidly unworkable parts of a human frame. He could no longer walk or, indeed, send to or receive any sensation in his lower limbs.

He was young, and he was handsome, or might have remained so except for the brooding defeat in his eyes and the contortions of agony that racked his face. He was unaware that the dislike for the woman standing before him had become a visible element of his very being.

There was more to his appearance. Strapped to his waist in a thin but heavy pack were mercury-cell batteries, capable of sustained power outlet at full capacity for several hours. Parts of his back resembled a haphazard pincushion. Thin wires encased in protective plastic sheaths were taped to his skin. Along the upper half of his back the wires disappeared into the skin. They had been implanted, through a still untested surgical technique, directly into the complex workings of his spinal column. The woman standing before these wire-studded remains of the man had done that job only

several days before. Metal wiring running into the skin and attached with exquisite care to the wires of human substance that had been grown over so many years within his body. The wires extended from the upper portion of his back to a point just below that of his injury, where metal had sliced and in an instant destroyed the ability of his own spinal nervous system to transmit neural commands from a brain to lower extremities.

All this time the woman had been watching the man. No expression showed on her face, though her eyes were intense. She missed nothing. Dr. Page Rossi *never* missed anything. Dr. Page Rossi; MD. Biosciences PhD. Pilot. Physical training expert. A woman who knew the workings of the human body as well as she comprehended the surges of energy in wires. Electrical energy that rushed through wires or radiated from microwave discs was as familiar to her as the neural impulses transmitted from their electrochemical sources within the human brain and its subsidiary systems called the body. She had managed her own intellectual linking of the two, as a man might equate the walking of a man with the rolling of a vehicle. The end results were the same, no matter the means of locomotion, the shape of the carrying body.

Dr. Page Rossi in her marriage of electronics and human systems—that brave new world of bionics—was the first woman in the entire country to have her masters in bionics. All the more noteworthy because only eleven men in the nation before her had ever achieved that status. And none of those eleven had plunged so imaginatively into her new discipline. What the body had lost through injury could, she insisted, receive compensation and functioning ability by introducing artificial neural pathways. If what nature provided failed to work a substitute could be established.

Even if it meant the exquisitely complex and mysterious nerve banks of the human form. She had pressed home this research at the United States Air Force Medical Research Center in Colorado, just north of Cheyenne Mountain and the Air Force Academy. Grisly, could best describe her work. After all, the business of pushing tons of metal with knife-edged wings through the sky was guaranteed to produce its own crop of battered, torn and misshapen young men. Young-old. Youth flees before physical mangling. A man who is one moment a bright-eyed, swiftly-reacting pilot, and the next a mass of tangled, torn nerves and sinew, is of the living dead. No age there.

The man clutching the guide rails, staring with tight face at Dr. Rossi, shook his head. Dick Manners. Four months before one of the best RS-71 pilots in the country. The great Blackbird he flew had stumbled on landing, and the results were right here. Undeniable.

Dick Manners, who not so long ago had worn the insignia of an air-force captain, saw none of the dark beauty in the woman's face. Not even her medical gown could hide the warmly feminine lines of her body. Dick Manners didn't care about that. Sweat streamed from him and he tried to shift his body. What should have been a sudden cry of pain was choked down with a gritting of teeth. A trickle of blood appeared where he cut the skin of his lip.

"No . . . no way," he gasped. "Just . . . can't hack it."

"I don't believe you."

Sharp, humorless laughter. A strained grunt more than anything. "Go . . . go to —."

"The spirit's not dead, anyway. Not yet."

She glanced at the metal object in her hand. Small dials and a flow indicator. Despite what this man before her might think there *was* a neural energy flow from his back into the

wires and right down past the point of injury into his lower system. But she needed to galvanize not metal or sinew but the magic cells within his mind.

"You don't reach me, captain. You've quit."

"Right . . ." Another sharp intake of breath that went along with his pain.

"You've quit being a man."

"Why, you—"

"*Walk*, you self-pitying—"

His fingers spasmed into claws. God, if he could only get close enough to get those powerful hands on her, he would—

"You spineless nothing, *walk*!"

He stumbled, fought.

Steve Austin leaned forward, his chin cupped in one hand. His fascination with the scene displayed on the several television monitors before him was total. "Look at her, will you?" he said to Dr. Rudy Wells. "She's a barracuda with sabertooth fangs."

Wells nodded. "She's good, all right."

Steve glanced at him. "Good?"

"You're not seeing what she's doing. Do you really think what she's *saying* is going to hurt that man?"

"It's not what she's saying, Rudy," Steve said with exasperation. "He's been suffering and she's twisting the knife—"

"Giving a paraplegic a chance to walk instead of being condemned to a bed or a wheelchair all his life." Rudy Wells didn't bother to add that he'd once faced the same problem with the man by his side when they'd dragged an unconscious, burned and mangled Steve Austin from the shattered wreckage of a lifting body spacecraft on the desert floor. He didn't say it and he didn't need to make the point. It wasn't

really necessary when the man by your side was a bionics miracle in his own right.

Steve Austin sighed, leaned back in his chair. For several moments the two men watched and listened to the TV monitors giving them six different views of what was going on in the other room. "Well, I'll say one thing for you, doc," Steve said to break the silence. "I never figured on a woman in this program. Not to mention the famous—or infamous—Dr. Page Rossi. From what I've heard she's more machine than woman."

"Don't be so quick, *colonel*. I don't know what you've heard about Page Rossi, but I'll tell you that the woman you're looking at right now is *the* best in the business of symbiotic relationships where you're replacing damaged nerve and muscle systems with bionics circuitry. Maybe," Wells corrected himself, "I'm being too free with the term bionics. We've been so close to the subject we tend to forget there are sometimes more practical ways of solving—"

Steve's eyes narrowed. "More practical?"

"You're a bionics system that's singular," Wells reminded him unnecessarily. "There aren't enough doctors and specialists, and there isn't enough money, not yet, anyway, to apply what we've been able to do with you to large numbers of people. In the future, yes. Right now"—Wells shook his head—"the logistics of it is too much. So Dr. Rossi has adopted a different tactic. She's applying tough reality to what she's doing. She wants her work out of the laboratory and right there in the paraplegic training rooms. Oh, you could call it bionics and you'd be accurate, Steve, but it's on a completely different level. For example, Dr. Rossi doesn't work with amputees. Prosthetic devices she leaves to the specialists. She works with men like Dick

Manners there." He pointed to the screen. "There are so *many* of them for whom there's never been any real hope. The need for a fix isn't that esoteric. If it was, Steve, then the hospitals in this country wouldn't be filled with men like Manners who are condemned to the kind of life that's a living death. To many of them, anyway."

His face reflected his genuine admiration for the woman. "She tries to bring damaged systems back to life. She can do grafting work with nerves and muscle systems like other doctors use plastic tubing to repair veins or arteries. If she can't bring damaged systems back to life she works around them, just as she's doing with that man at this moment. His spinal cords are severed, Steve. Implantation, repairs, whatever; they didn't work. Dick Manners is one of those people written off as a hopeless case. In all respects, as far as his lower body is concerned, a basket case. She's running a bypass system down his spine. A detour route, as it were, and—"

He interrupted himself as the woman's voice came, harsh and angry, through the sound system. "You miserable . . ." she was snapping at the crippled pilot before her, "you're supposed to be a *man*! Remember?"

The pilot had lost everything beyond getting his hands on this maddening creature in front of him. His face again mirrored the conflict between pain and the urge to destroy what had crawled into his brain and begun etching its own acid through his mind. He tried to walk; his body jerked with loose animal control.

Before he could understand what she was doing, before his astonished mind could react to her sudden movement, she stepped forward within reach of his arms and in one deft movement her hand touched the power control at his

battery-pack belt. In that moment she moved the battery-supplied electrical current to his nervous system from LOW to MAXIMUM.

The current snapped through him, jerking his body cruelly. His head whipped back as he fought to control the impulses shooting through him.

Steve Austin gasped in sympathy. "God, she—"

"*Walk, you*!" She made it an order to Dick Manners.

Hate now added to the current surging through his body. Swaying, spasmodic but walking, Manners, without realization of what he was doing, pulled his hands from the support rails, extending talon-like fingers. He was a parody of human movement.

But he walked. He literally stumbled and fell forward, his legs a travesty of human limbs, but a travesty infinitely to be preferred to uselessness. He foundered in his Frankensteinian lurch but somehow managed to move toward her, and as he reached out she slipped between those clutching fingers, moved in between his arms and, even on the television monitor, Steve Austin and Dr. Rudy Wells could see the astonishment on the man's face.

Because she had become human, with tears visible. "Oh, God, Dick, you did it . . . you're walking . . . you . . ." And her arms were around him, holding him.

But not holding him up.

Steve turned to Rudy Wells, who smiled as he saw the sudden look of respect. Steve Austin shook his head. "I didn't think she was human," he said after a while.

Wells stood up slowly. He learned forward and punched off the television monitors. What happened now between Dr. Page Rossi and Captain Richard Manners belonged to their private souls. He had no desire to intrude.

"She isn't," he said finally. "That's right," he added as

he saw the surprise on Steve's face. "She isn't human, as you'd like to think of her, all dewy-eyed at this moment. What she did when he reached her was as much of an act as when she was berating him. Steve, I think you've met your match in Page Rossi. First, last and foremost she's a doctor. I should mention," Wells said, "that she is also a most competent psychologist."

Steve stood with him. "And I'm supposed to work with *that*?"

Wells laughed. "Someone had to draw the short straw, colonel."

They left the room and walked together down the hospital corridor. "What time are you flying tomorrow?" Wells asked.

"Wheels up at nine in the morning," Steve told him. "Which means we leave here in three hours. We'll stay at Edwards Air Force Base tonight."

Wells nodded. He thought of the little killer to which Steve Austin would be returning. "Steve, how do you . . . well, you know. That machine. How do you feel about it?"

"Normally, Doctor Wells, I'd be scared out of my tree. Until I saw your Dr. Rossi in action. Compared to her, the meanest airplane in the world is a pussycat. In comparison, of course."

CHAPTER 2

They came down from Colorado in the big F-4 jet fighter at fifty-three thousand feet. The powerful Phantom rode the thin skies of the stratosphere with contemptuous ease. Far behind their bodies two jet engines howled, but no thunder reached them. Steve Austin in the front seat of the tandem cockpit, Dr. Rudy Wells bundled in the back, snug in pressure suit, parachute harness, helmet, oxygen gear, seat belt and shoulder straps. For more years than he ever wanted to remember, Rudy Wells had clamped down on an unreal fear of flight. Good God; a flight surgeon who *flew* as often as he had, and scared to death of getting his feet more than an inch above the ground. "Whenever I get to the tremendous height of three hundred feet," Wells would confide uncomfortably to close friends, "I go into instant nosebleed."

And yet now he was high enough to see easily the curvature of the planet itself, the sky directly above through the plexiglas canopy a deep purple-blue, the signature of the

vacuum that lay above the onionskin shell of atmosphere—and he was as comfortable as if he were seated on a couch in his own living room. He owed it all to the man in front of him. He could at this moment see only the back of Steve's helmet, see his arms moving. But Steve had a mirror up there through which he could watch Rudy Wells when he needed or wanted to, and Wells caught reflections of movement from the pilot.

All about them stretched a special world. Distance flattened the far mountains to sand dunes of gentle undulation. The harsh sun baked out details, and the horizon swept quickly from the white glare of the sun to that dustless purple-blue marking the first boundary of space. They had virtually no sensation of movement. No disturbances in the air, no turbulence, not so much as a ripple. With plexiglas all about him Rudy Wells commanded a magnificent view. Despite their great speed they seemed to float through the sky, a phrase used often but still the only really accurate one to describe the sensation of their movement. A gentle wafting through the near-heavens. No sign or feel of the enormous power that swept them with flaming thrust through this pale and tenuous air. It seemed as if the earth unrolled slowly beneath them, that they were standing still, impossibly, and it was the earth that was moving toward them. From Colorado on down to the dry and flat desert of California, it was an easy thrust that made a mockery of high mountains, that turned rivers into the thinnest trickles of pencil-lines scrawled lazily along a height-flattened world.

That fear he had known. Steve had told him there was only one way to beat it. Forget fighting the airplane, forget trying to rationalize his sensations from height or speed. "Rudy, do you trust me?"

Only more than his life. Keeping Steve Austin alive after he had smashed into the desert in a slashing tangle of

wreckage was a pretty good way to forge a sense of trust—both ways. Three limbs gone, an eye gouged out by hot steel, ribs smashed, and—well, that wasn't life to a man who'd flown most of his life and had been the last American to walk on the surface of the moon. Keeping Steve alive in that condition would have been the most awful cruelty. He'd done better for Steve . . . Rudy Wells pushed aside what had happened with Steve and recalled the question directed to him, the doctor with an irrational fear of flying, of height, of swift and turning movement. Yes, he trusted Steve Austin. No two men could be closer.

Once Steve had forced Wells to verbalize that trust, he told him to gamble on it. *All* the way.

"The next time we fly," Steve told him—and there was no mockery in his face or in his tone of voice—"accept that you're going to get killed."

"You're as mad as a turnip," Wells told him.

Steve grinned. "Just accept it. Just stick it into your mind. There's nothing you can do. You're helpless."

"Then what?"

"Then sit back and enjoy it."

"Are you crazy?"

"No, but your fear of flying *is*."

"True."

"I mean it," Steve persisted. "Accept that you've bought the farm, there's nothing you can do about it. Then, when you *know* the end is there, just relax. There's nothing you can do about it then, right? Know what happens next? Your sensory input level goes way up. What turned your stomach into knots before becomes a pleasure. You start to take in, to study, to enjoy what's happening because you're no longer afraid of it."

"I'm dead, huh? Okay, I'll keep telling that to myself."

"The living dead, if you don't mind."

And it had worked! It was bad for a while, to be sure. Wells fought the gut-tearing sensations. He sweated and groaned; his teeth chattered, and then something happened and he told himself, I'd rather *be* dead than suffer through this any more.

And the heavens came alive for him. When the big jet fighter slid off a wing, rolling slowly until it was on its back and plunging earthward, Rudy Wells no longer recoiled at the sight of mountains expanding, lakes swelling in size, everything magnifying swiftly as the earth rushed upward. *This* time he looked forward—straight down—eagerly, drinking in the incredible sensations. He watched the horizons on either side of the plexiglas leaping upward, clouds changing from hazy globs to sharp outlines, details emerging from flatness, and he had a ball with all the visual inputs. When they pulled out and the g-forces mounted and the bladders in his pressure suit squeezed him he went along *with* the sensations, and he loved every moment. When the fighter came around on the top of a loop, he didn't hang in his straps, petrified. He became a keen and excited observer.

He was just preparing to talk to Steve when the pilot, as if reading his mind, spoke first. "Ready to give it a try, doc?"

Rudy laughed with pleasure. For a while Steve stayed on the controls with him, guiding his hands and feet until Wells had the hang of it, until Wells knew just the right amount of hand and foot pressure to apply to the sensitive power-boosted controls. Free of the fear that had gripped him, utterly and absolutely given of himself and his very being to Steve Austin, Rudy Wells took a powerful jet fighter through loops and rolls and heady wingovers. He burst into and through and beyond the speed of sound, going straight up and straight down, and he turned the horizon of the planet into a crazily gyrating cartwheel.

He was never again afraid when the earth fell away beneath soaring wings. It was a remarkable experience, all the more so because he, Dr. Rudy Wells, had saved this man from a fear as deep and as gripping as anything Rudy Wells had ever known. Far worse, really; Steve had suffered a horror of *living*.

Rudy Wells thought of that now as Steve eased the nose of the big F-4 fighter below the horizon. They were over the baked California desert on their southward flight from Colorado. And it was much more than simply reaching California, sliding downward to where they would find the dry lake beds and the long runways and hangars of Edwards Air Force Base, where the Air Force headquartered its Flight Test Center, and the Air Force and the Navy and NASA and the Army and the FAA gathered their strength and skills in trying the unknown.

Down there was where Steve Austin had ceased being a man—at least in the ways he thought of the term man. The nose of the big Phantom dipped just a hairline lower and Rudy Wells didn't need to glance at the instruments to know that they were lessening the height between them and the unyielding earth. Wells looked about until he recognized the expanding landmarks. There. Lonely Mountain, well beyond the ridges of the San Bernardino, the San Gabriel, the Shadow Mountains. Wells carried his vision to the sun-baked, hard-as-stone desert floor of Rogers Dry Lake. This was the Mojave, where men used what nature had pounded into flatland as a great runway for strange winged machines. Along the western edge of the Mojave, that fateful morning years before, they had clustered through a long night, preparing for the moment when Steve Austin would lift from the ground, sealed within the gleaming metal body of the M3F5, the machine itself suspended beneath a wing pylon of a huge B-52 bomber.

An airplane? An aerospace machine? Hardly either one, for it was a shape that defied aerodynamic engineering and the sensibilities of the human eye. It wasn't aerodynamic; it had been molded in the form of a blunt dart with stubby appendages jutting starkly from a rounded body in the form of a bathtub. The three flaring fins angling up and sideways from the aft section and the lack of wings were enough to make a stone statue of a pilot. Up front, where he would have an undisturbed view of whatever awaited him in flight, was the shaped glass enclosure within which he was strapped. One wag in the ground crew had named the machine "The Snout." Appropriate, for it did look like an undersized whale with a transparent snout.

Rudy Wells saw the desert floor enlarging in size as they descended, and in his mind's eye viewed again what had happened those years ago. Steve Austin had dropped away from the huge sheet of metal that was the B-52 wing. He'd punched in the rockets and lifted the nose and the tiny beast screeched at the fleeing world as it ripped into vacuum. He'd taken the M3F5 to more than three hundred thousand feet and brought her back down into atmosphere, and Rudy Wells was standing on the hot desert floor when the silvery shape arrowed back through atmosphere, the chase planes riding herd on the vicious flying bathtub, just how vicious they discovered when a gust slapped a rounded edge against the desert floor.

Wells closed his eyes at the memory. The sickening swerve of the nose, the helpless yawing, a gear leg stabbing into the ground and snapping like a bird, the tearing, drunken rolling. Wells saw it all again. He tried to force it from his mind but it wouldn't go away, like a film he was condemned to watch from the beginning of the reel to its end, seeing the bathtub take the punch of impact through the rounded belly,

hearing the bone-snaps of breaking metal, watching her carom wildly like a wounded mortal thing back into desert air. Then she came apart, splitting open, showing her innards to the world, and there were spewing liquids and spray and debris, and all that time Wells *knew* who was inside, what must be happening to Steve Austin. There was the growing spume of dust and wreckage and fuel and the spray of blood, then blazing fire, a sputum of machine and man.

Rudy Wells had been one of the first men there, with the crash crews, the fire fighters, the doctors. They got to Steve in time to save his life.

But that was about all, and what they dragged from the shattered wreckage hated them for not letting him perish along with his ship. He was, mercifully, unconscious, and he was alive, and that was about all that could be said for Steve Austin. One instant he was a superb test pilot, an astronaut, a man who'd scuffed the airless dust of the moon's surface.

A timeless moment later he was a travesty of a human. Rudy Wells squeezed his eyes tighter, trying to whip that memory film through his mind, get it through his skull and *out*. But he'd lived too long and too intimately to dismiss easily what had occupied every waking moment of his life, had haunted his dreams. A man who had both legs amputated. Remains of a left arm sliced away with surgical steel. Shattered ribs that had to be held in place before being rebuilt and replaced. There was that key—*replaced*. Patch, wire, repair, integrate, and *replace*. They patched what was left of his jaw and replaced what was missing. Steve Austin became a wondrous assembly of flesh and bone and steel and alloy and ceramic and wires and solenoids and plastics, all of it woven together with extraordinary precision. There had been open-heart surgery and the implantation of a Hufnagel valve

to replace a crash-damaged valve. The skull was fractured. There was concussion. Skin burns. Shock.

A left eye gouged from its socket. They nearly ran out of miracles with that one, and for a long time afterward the left eye remained low priority. First they brought what was left of Steve into a hyperbaric chamber, a sealed room with heavy overpressure and pure oxygen, and an electrical humming into his brain to keep him unconscious for weeks. Steve needed a friend . . . time. Time for shock to evaporate slowly, for cells to reform and adjust to whatever misshapen form of life remained from the crash.

They kept him alive; then began the real miracle.

Getting man to the moon had been a series of miracles, small and large, in its own right. The technology to slingshot a hundred thousand pounds of spaceship and men to another world had spawned a host of other miracles—miniaturized and subminiaturized and superminiaturized . . . electronics that only years before had been a thin dream . . . materials that hadn't existed a decade before . . . the great electronic computers to study myriad ways to attack a problem and to come up with the right answer within days instead of within centuries.

There was an organization in Washington called OSO—Office of Special Operations—a sort of catch-all of the truly best from the CIA and the FBI, from military intelligence and the National Security Agency. OSO had unusual powers, and one of its great strengths was that it could initiate medical, engineering, scientific—any kind of research to better its own mission.

They had long wanted to rebuild a man in a better image. OSO had a mission. Steve Austin was a wreck of a man, but he had what OSO had waited for for a long time: extraordinary brain, skills engineering and scientific, proven

courage—all the factors OSO needed to combine with a bionics product.

Half man, half machine. There was a bionics laboratory dedicated to basic research carved deep in the flanks of the Colorado Rockies. OSO had six million dollars to lay in the hands of the Air Force. Six million dollars, a torn and ripped human remnant, and that laboratory all gleaming new and shining with engineering and life sciences and cybernetics and biology wrapped up into a package that existed nowhere else in the world.

Rudy Wells began to think of it as the left hand of God, for within this secret lab were men who knew how to run through electronic brains every element of construction and movement of, for example, the human arm and hand. The computer created its digitized equivalent of flesh and blood, sinew and muscle and tendon, veins and arteries, bone and marrow, and the near-infinity of the complex structure of chemicals and electricity that made up the human being.

Rebuilding Steve Austin—against his will, to be sure—brought forth arguments about the semantics of "life" and "living." After all, the same kind of electricity that coursed through power lines also moved along the neural pathways of the human being. No matter what special qualities endowed life in the human form, one couldn't deny that the human body functions on messages carried through electrical impulses generated by electro-chemical reaction. Nervous energy *is* electrical energy, even if the marvelous intricacy of the human form deserves a better analogy than to a weak, self-powered battery.

Bionics contested no one's semantics. It just did what it was capable of doing. Under the whip of Drs. Michael Killian and Rudy Wells, the bionics team went to work with a vengeance to rebuild—or perhaps to build a new Steve

Austin. Bionics. *Bios* from the Greek for life; *ics*, meaning "in the manner after." A bionics system was an artificial replication of one created by God and nature.

Steve Austin became a cyborg—a cybernetics organism. Cesium and new alloys replaced shattered bone, and his skull gained a spongy center layer and yet another layer to protect the brain case within. What had been battered in the crash emerged as a skull superior even to the natural; Steve could endure without injury a direct blow perhaps ten times greater than the force that would crack the human skull.

They didn't merely replace and mend. They installed—tendons, plastics, tubes, wiring, bridge-like structures of bone replaced by metal.

They couldn't do a thing about giving him back the vision he'd lost in his left eye. They could perform miracles but they couldn't create life. The human eye is a Godlike creation of jelly and water and light-sensitive elements and rods and bundles of nerves and trickling electrical impulses, all connected beautifully to a convoluted tiny computer also called the human brain. The optic nerve of Steve's left eye had been mangled, and that was that. Science still didn't have the means to patch up such biological savaging.

For some time, when he entered OSO operations, Steve wore—or carried within the artificial eye emplaced in the socket—a miniaturized camera that took its pictures in either normal light or infrared. That camera—and he had used it underwater and on the ground and in the air—no longer filled the socket. It had been many months since Steve had gone off on an OSO mission, and the Air Force seized on the opportunity to try something wholly new. They fitted Steve with an artificial eye. It couldn't "see" as did his right eye, but it was connected to his normal vision through an electrical system. Within that ceramic eyeball was an ingenious rangefinder. It had been developed from the microcircuitry of

homing missiles, and when he used the eye—activating it by applying light pressure to his left temple—Steve saw, over and above his normal right-eye vision, the equivalent of a power scope with grid markers and magnification up to fifty. In effect, he had a monocular eye with range-judging capabilities. The air force wanted to test that capability in flight—and hopefully in space.

Everything else paled compared to what had been done with the limbs Steve had lost. He did not have an artificial arm. Nor had he been given two artificial legs. It was beyond that. The most advanced electronics, technology and science, abetted by millions of dollars had provided Steve Austin with man-made *living* limbs. *An arm and two legs that were alive.* He had been provided with bionics-created limbs that functioned in every way as his own limbs, with the exception that they lacked the capacity of pain in its normal sense.

The bionics structures that had been grafted, implanted, integrated to Steve's limb stumps were living re-creations down to bionics bone and cartilage giving natural dexterity. They did not have, nor did they need, the flow of liquids structure of cells, or the pumping systems of the normal limb, or the kinesthetic senses of hair. But they did have dexterity matching and even exceeding that of the original man, and their strength gave Steve Austin extraordinary prowess.

The doctors and scientists, in fashioning the bionics limbs, carried out complete mimicry of the nerve fibers and systems for transmitting impulses from the brain into the spinal cord and on down to the message networks. To Steve's arm stump they double-engaged the bionics and the natural bone to exceed by a factor of ten the original level of strength and resistance. They connected actual nerves and muscles and tendons with their bionics equivalents. But the signals that came through, while they served well natural

flesh and its constituent elements, were impossibly weak for a bionics system. So into the arm and the legs went small, nuclear, isotope-powered generators that spun silently at speeds measured in thousands of revolutions per second.

The command sent from the brain of Steve Austin flashed through his living systems until it reached the bionics materials that had been fashioned by computer and machine lathe, there to be sensed and flashed to an amplifier. As swift as electricity could move through his systems the signal was retransmitted at many times greater strength than when received. The tiny isotope generators coursed power through the bionics duplications of nature's pulleys and cables, which moved, twisted, bent, pulled, contracted, and squeezed. But artificial fingers, especially the fingertips, tended to be insensitive, and a cybernetic hand without restraint could crush human bone with no more effort than that needed to squeeze a paper tissue. The solution came in the form of vibrating pads, sensors, amplifiers, feedback. Now the steel-boned fingers that could kill with mace-like force could also caress a lover's skin.

Rudy Wells shook his head as they arrowed toward the earth, one wing slanting downward, the other stabbing sky. The closer they came to the hard dry earth of Edwards Air Force Base the closer they were to that terrible moment in time and space when Steve had been mutilated. Yet it was as much rebirth as it was destruction, and with that rebirth there had been the pain that must accompany the rising of every phoenix from its own ashes. The change from torn remnants of a human being to a cyborg had been hellish, a physical and emotional torture chamber from which they sometimes doubted Steve would ever emerge. For month after month he stumbled and fell, weaved and swayed; his systems jerked spasmodically. They short-circuited and surged. He was clumsy and crude and filled with hate and rage. Which was

why, Wells realized, Steve empathized so strongly with Dick Manners as that man tried to fight his way out of his paraplegic prison.

Was the pain worth the reward? More than once Steve had tried to squeeze out the spark of life in his brain. But they had brought him through, and just as miraculous as his physical change was his return to the emotional health he needed as badly as his bionics structure.

The physical rewards! If his bionics arm was not quite the same as the original limb, it was in many ways superior. His arm did what it had always done, and more. It was also a battering ram, a vise, a wrench, a pliers, a bludgeon—it was a hand and a tool and a weapon. His bionics limbs were pistons. The isotope generators amplifying his mental commands attended to his energy needs for leg movement, and so his endurance increased greatly.

He was also as dependent as he had ever been, and as much as any other man, upon his heart and lungs, his kidneys and bladder and glands; at the same time his bionics restructuring made him superior. Pacing himself carefully, he could run for a day and a night and a day again because there was no energy drain from the bionics legs hammering the earth.

Steve Austin, with the help of Dr. Rudy Wells—and his love for a woman who had died in the deserts of Israel's battlegrounds—had won his greatest fight to emerge whole in his emotional world. There had been bitterness that had flayed his own mind and the sensibilities of others about him. He had been rebellious, jealous of his privacy, demanding relief from the missions assigned him by the OSO.

Yet he had come through it all, as much a renewed personality as he was a new person.

Rudy Wells felt the slowly increasing pressure as Steve eased the big jet fighter directly over the runway of Edwards Air Force Base. Funny, he thought. This is where the fires

had raged that had torn apart this man, and now he was back, with capabilities no man would have thought possibile when his body was mutilated. Well, he was back "home" in more ways than one. OSO was now behind him, and Steve had returned to the element that had spawned and shaped him more than any other. The sky, and what lay beyond. There was a new mission. Not simply to be flown, but to be undertaken. A mission, a project, a program that perhaps could have greater significance than even the wonder of his bionics being.

It would begin the next morning.

The big fighter screamed down the runway. Steve lifted the nose gently, and in the back seat of the Phantom Rudy Wells felt the g-suit squeezing him as Steve whipped stick and rudder to one side and the fighter stood on a wing, howling as Steve pitched up and out to come around for a landing.

Like always, it was rough to hang on the edge of blacking out. I'm getting too old for this sort of nonsense, Wells thought groggily. He shook his head to chase away the blurring colors. He was also too stubborn to admit it to anyone but himself.

CHAPTER 3

The most incongruous officer in the United States Air Force met them at the flight line where Steve parked the big Phantom jet fighter. Colonel Ted Anderson, USAF, director of flight testing for the Air Force at the sprawling desert air base, sat hunkered on the hood of a jeep, idly watching Steve wheel the fighter plane smartly about before bringing it to a stop, the nose gear bouncing gently on the oleo strut. Ted Anderson was incongruous, but for no single reason. When they'd cast the figure of Anderson they'd thrown away the mold.

The jeep itself, with outside air temperatures up to 115 degrees in the shade, was an incongruity unto itself. A full-ranked colonel deserved, and had, an air-conditioned sedan. Other colonels used them. Anderson rarely did so. To him the sealed enclosure of an air-conditioned vehicle robbed him of the sounds and smells and feel of what went on about him at the sprawling facility. He wanted to experience directly everything that went on about him. Wind-blown dust

was invariably found on his uniform and, above all, in what seemed impossible to find on an Air Force colonel on active duty—a bristling, fierce beard.

It simply didn't *fit*. When the Pentagon told Anderson to get rid of the beard, he told the Pentagon to remember where and how he'd grown the thing in the first place. That sort of unhinged the higher brass, for the entire nation had come to know of the Anderson Saga in the Antarctic. A group of scientists had survived a crash in a remote, frozen, storm-whipped area. Rescue was impossible. Ted Anderson flew out of his base, accompanied by an equally lunatic master sergeant, with only the two men in a huge C-130 turboprop assault transport. Somehow they found the crash site. Somehow Anderson put the Hercules down in blinding snow. He had also brought with him full fuel tanks, emergency provisions and heaters powered by auxiliary generators. For twelve days and nights he kept the scientists alive. Everyone thought Anderson was dead along with the men he'd set out to find. After twelve days—and the beard now growing very nicely—the storm eased enough for Anderson to try to get the big transport out. But they had to pound down the snow, the scientists stumbled and collapsed and finally refused to go on in the bitter cold.

Colonel Ted Anderson, a gentleman as prescribed by the Congress of these United States, found it necessary to apply fist to jaw of one recalcitrant, booted foot to the rear of another, and had roared threats at everyone else until they had managed a bare runway for the airplane. And then he had done his job—flown them out, to the astonishment and delight of everyone who'd given them up for dead.

He'd also refused to shave off the beard. He was wearing it—albeit trimmed neatly—when the head of the Joint Chiefs of Staff pinned onto his tunic the Air Force Cross, the

second highest military award for courage and valor in the nation. Later, behind closed doors, the Air Force brass decided it was better to risk tilting the barrel of regulations than losing the extraordinary skills and elan of this remarkable pilot and officer.

And now he was up to his neck in flying and test programs at the Air Force Flight Test Center, sweat-stained and dust-covered, and loving fully every moment of it. Steve raised the canopy of the F-4, pulled off his helmet and waved to Anderson. The bearded giant slid heavily from the jeep hood and ambled over to the fighter. For the moment all he could see of Rudy Wells were two eyes staring beneath the curving edge of the doctor's crash helmet.

"Where's the medical varmint, Steve?" Anderson called.

Steve jerked a thumb behind him. "I think he just threw up."

Wells emerged slowly, pulling away the helmet, unstrapping and unbuckling and disconnecting himself from the airplane. "You both go to hell," he murmured. A crew chief reached out to steady his erratic descent down the ladder. The sergeant had helped Doc Wells down many airplanes, knew and understood the cause of his irascible humor at such times. Everyone at the test base knew Rudy Wells. Impossible not to when you recalled what had happened when Steve Austin went into the desert at a couple hundred miles an hour—and that this was the same flight surgeon who'd brought him back from the dead.

Wells reached the jeep. "Why can't you drive a civilized vehicle?" he demanded to Anderson.

"Because I'm not a civilized man," Anderson answered easily. "The world is full of civilized people. They meet in Geneva, where they plan how to carry on future world wars. Me, I'm *un*civilized and—"

"And barbaric," Wells finished for him. "For God's sake, Ted, this isn't an endurance test. Get me inside where I can get a cold beer."

"All in good time," was the reply, and Wells knew he was in for a slow drive along the flight line. Not that he minded, really. It had been some time since he'd been here, and any time you were away from the flight test center, even for only a few months, a new world awaited your return.

"By the by," Anderson told him as he wheeled the jeep around the tail of a huge B-52, "they've assigned a new project officer to your new project, Steve."

They waited as Anderson went on . . . "Me . . . I'm your boy. And you're mine, Stevie boy."

"Let me out right here and now," Steve shot at him.

"Sorry. No stops before end of the line."

They drove in silence for a while, Anderson moving slowly. The impression of a vast and stirring change, no matter how quietly it was taking place, came into their minds. For years the effort here at Edwards Air Force Base had been to hammer back the frontiers of flight. To push higher the limits of speed, to nibble at killing shock waves. Men treaded cautiously along the shoals and reefs of high-speed flight. They rose painfully into the thin air lying at the base of vacuum. They pounded through air with thickening resistance until the supersonic barrier was behind them and they had run into the thermal barrier, and then their speed was limited by the temperatures at which plexiglas softened and metal weakened. It was literally a hellish run when the machine you flew began to yield to temperature.

They flew massive piston engines and huge flailing propeller blades of every shape and description. Hundred-ton monsters that were all wing-knifed through the air. The base, indeed, was named for a test pilot who had been killed

at the controls of one of the great flying wings. It was a thought that every man who knew what went on here never forgot: that every street of Edwards Air Force Base was named for a test pilot who had been killed pushing back those myriad and lethal frontiers of flight.

There was so much more to it than record attempts. Men tested stability systems that, once perfected, would bring to huge bombers and transports and airliners a degree of automatic stability that increased vastly their safety under dangerous conditions of flight. They tested supercritical wings, airfoils of wicked shapes that promised efficiency in flight that once had been only a dream. And they threw their machines deliberately into vicious gyrations, testing them to and beyond their limits if only to determine just what were those limits.

The dividing line between aircraft flight and journeying into and through aerospace had been left behind a long time ago. The two disciplines had merged. Colonel Anderson drove them past a variety of machines ranging from featherweight liaison aircraft to monsters tipping the scales at eight hundred thousand pounds.

A needle-shaped black creature was being towed before them. Anderson braked as the three men studied it. "Looks like one of the Blackbirds, doesn't it?" Anderson said quietly. "But it's got a wing like nothing you've ever seen before. Pressure bleeding from the engines for constant bleed-air lift. We've been getting steady cruise at a hundred thirty thousand. She really moves out." He shifted the jeep into gear and moved ahead slowly. "There's another one of these we're developing with NASA. Back to the old ramjet engine idea. Every time we tried it before we ran into problems. We're working with a new engine called the scramjet. Combination of a turbofan and a ram system. It's

giving us fits but if it works . . .'' He let the words drift off. They both knew the program. Hypersonic flight—five times the speed of sound—on a sustained basis, and *without* rockets.

''What about the Bucket?'' Steve asked. ''Charlie Howell was telling me about it.''

Anderson nodded. ''Still early in the game. We've been playing with that one for fifteen years now.''

''Bucket?'' They heard the query from Rudy Wells in the back seat.

''Bucket. Scoop. Dredge. The crews give it some wild names,'' Anderson explained. ''But then, the whole idea is pretty wild to begin with. We use RS-71 engines to get the thing to high altitude. We need mach three to make it work. The internal machinery has an adjustable scoop, which brings in air and compresses it almost to a liquid state. While the thing is whipping along, it's separating hydrogen from the ram air, and then liquifying it, and at the same time using its cryogenic systems to keep it supercold. You know, like the liquid hydrogen in the Saturn rocket upper stages. When it fills the tanks, it mixes it with liquid oxygen; we fire up the rocket chambers, the jets shut down, and we've got a pure rocket vehicle that's climbing on thrust alone. The wings are just dead weight, then.''

Rudy Wells was incredulous. ''You're talking about using the upper atmosphere as its own filling station.''

Colonel Anderson grinned. ''That's the best description I've heard yet. I'll tell it to the project team. They'll like it.''

''But why,'' Wells protested, ''isn't there more attention to such a program! It could revolutionize everything we're trying to do in space and—''

''Hey, doc,'' Anderson said, ''you forget we've been working on this for fifteen years. That's too long to keep the

fiscal hounds in Congress happy. If we made this thing a separate project, Washington would be demanding results on a schedule. We're not ready for that yet. So we keep the program buried in general aerodynamic research." He didn't look happy about it. "With inflation and all the cutbacks we've been going through they'd bury this program. So we—"

"But *why*?" Wells demanded.

"Because there are times," Anderson said softly, "when our people in Washington aren't as smart as they'd like to be. Or we'd like them to be." He had a gentle smile on his face. "Like the old days when the American Medical Association suggested tea was one of the more dangerous substances to be taken within the human body."

Wells stared at him, then nodded.

A huge apparition blocked out the sun. The jeep stopped beneath the wing of a massive Boeing 747, atop which hulked a complete, full-sized mockup of the Space Shuttle the Air Force and NASA would be taking into its first orbital missions in 1979. The two vehicles together were unbelievable, overwhelming even the enormous Lockheed C-5A Galaxy transport parked nearby. The 747 was beginning its initial flight tests with the Shuttle—itself the size of a Douglas DC-9 jetliner—to determine aerodynamic characteristics. Later, when the first flight models of the Shuttle were ready to test their wings, they would be borne to high altitude by the 747 and then cast off to fly on their own. Still later, when the first Shuttles returned from orbit to land on the enormous dry lake beds of the California desert, they would be bolted to the 747 transports for hauling back to the Kennedy Space Center in Florida for new launches into space.

But the strangest of the machines they encountered along

the restricted flight line—where security was in effect—was the oblique-wing experiment. A Stretch DC-8, the commercial transport with an extended fuselage, had been fitted with a weird, tapering wing that pivoted on a hinge above the fuselage. One end of the wing stabbed into the air, and the other trailed, as though the wing were twisting crazily about its center. For takeoff and landing the wing rotated to normal position. At high altitude and speed, the wing rotated to its crazy angle—and gave better performance than any wing then flying anywhere in the world. One more example of learning that the only thing to expect in this business was the unexpected.

Ahead of them, isolated from the rows of hangars and workshops, was another building. Even from a distance they could see the large sign reading Q on each side of the structure. Two rows of high fencing surrounded the building, and they were well aware that each fence line carried a lethal charge of electricity. There were also other defenses, more effective and less visible. Colonel Anderson let the jeep drift to a stop, and in the end of their rolling motion the desert heat embraced them and the world filled with distant sounds of wind, of engines, of the hoarse whisper from on high of some great machine cracking the high, thin atmosphere.

Steve Austin leaned forward, occupied with his own thoughts. They weren't scheduled to get inside that elaborately guarded structure until later that night. Impulse turned Steve to the colonel behind the wheel. "Ted. Let's go inside."

"We're supposed to—"

"Inside. Now," Steve insisted.

Anderson turned to the doctor behind him. Wells returned his gaze frankly, then shrugged. Anderson might be the project officer, and Wells could be the flight surgeon, and

there might be six generals riding herd on this project, but Steve Austin was the man who would fly the beast concealed within the hangar.

"Okay," Anderson said. He never argued with the moods of his test pilots. The good ones, the best ones—and Steve ranked with the best—had hunches, moods, sudden feelings that separated them from other men who flew. You didn't fight that. You went along with it.

They went through the security checks slowly, thoroughly, if a bit impatiently. Within the security fences they read another sign. ORDNANCE SYSTEMS TESTING —WARNING! HIGH EXPLOSIVES!

So much facade, of course, but necessary nonsense. They went through another security check, a steely-eyed brace of guards, one standing well behind the other, automatic rifle at the ready *and* with a shell in the chamber, and backed by two huge dogs. The steel fist in the velvet glove of protocol. Ted Anderson would have raked the skin off any man who didn't observe every minute detail of that security.

You could use a hundred expletives to describe the machine before them under the bright floodlights. No one dozen would be adequate. Her name was simple enough. An acronym, really.

They called her *Asp*. A foreshortening of Aerospace Plane. But Asp she was, despite her wings. Wings? They were razored foldbacks sweeping in scimitar fashion from the nose until they flared suddenly along their trailing edge, almost as if in afterthought to the very concept that she should have wings. No engine intakes. No jets within the thick yet deceivingly rakish body. Far back inside this thing was a thick-walled chamber that contained, or would contain on the next day, a mixture of liquids with several times the

energy yield of the most powerful rocket fuels ever flown. The Asp was all in the same breath rakish yet thick-bodied, bereft of wings yet with a scimitar airfoil.

Steve walked around her slowly, taking in every line. His faced showed no expression. Neither Wells nor Anderson bothered him, interrupted his careful acquaintance with this thing.

For the Asp was the natural outgrowth of the M3F5 that had nearly killed Steve, that had mutilated and tortured him until, for an awful period in his life, he had hated life itself. Now he had come full circle, returning to the flight test center as a bionics creature, and he was to wed himself once more to a package of steel and glass and liquid nitro, and unsheath flaming energy to stab through and beyond an atmosphere that contained within its embrace all the life of this world.

No easy task, this, and the two men watching Steve Austin understood the strange emotions that began finally to appear across his face. He slowly ascended the metal ladder leading from the smooth concrete floor to the long canopy and the strange cockpit within. Not a cockpit, really, but a mixture of cockpit and flight deck and cabin. He eased himself over the side. Carefully, with an unnoticed patience on his own part, he slid into the wide embracing seat. He let his body settle, knowing the seat was at this moment too large for him, but would not be so when he came back here again in pressure suit and helmet. He would bulk more then, and this seat had been engineered from its outset to take that suited bulk and weight. Without that bulk he felt like a child in the armchair of some impossibly large adult.

The cabin was actually a tandem cockpit, one seat behind the other, separated by a bulkhead crammed with instruments, cables, special equipment. The pilot would occupy

the front seat. Steve Austin; pilot. And; astronaut. And; *experimental person*. What a ridiculous name.

The front seat with fighter-type controls. With systems that provided aerodynamic control through ailerons and spoilers and flaps that made the wing breathe like a living creature. Other controls that came alive through thrusters for life in vacuum. Aerodynamic flight and centrifugal flight, a blend of atmosphere and the lack of atmosphere. The Asp—at home within the onionskin mantle of a planet, or beyond it.

The back seat was something else. He'd never seen it equipped. Not before this moment. He stood up in the seat and looked behind him at the rounded computer console, the banks of instruments, at systems that baffled him. He'd have time to learn them later. He eased back into his own seat, lost in the reverie of the control systems, trying to imagine what flying this would really be like.

He had no concept of how long he'd been in the seat when he sensed the colonel's presence by his side. Anderson had climbed the ladder and Steve turned to him.

"If you're going to fly this tomorrow, colonel," Anderson said, "'we'd best get cracking with what we have to do today. We're already late for the briefing with the support-and-chase people."

Steve nodded. He followed Anderson back to the hard concrete floor. On the way out, going through the security door, he stopped and turned for a long look.

Horrible.

Beautiful.

He felt the old chill.

CHAPTER 4

The copilot of Trans Pacific Airlines flight 603 tapped the shoulder of the man to his left. The pilot followed the direction of the pointing finger. They were over California, perhaps forty miles inland from the coast and flying south. To their right, to the west, the world was blackness. Nothing unusual, just a black unrelieved by lights. There were ground lights, but they were too distant and somewhat obscured by broken clouds between the aircraft and the ground to be seen.

Except this light. Neither man had to say aloud what they both knew. The light that appeared so suddenly in darkness was ascending, climbing up from the earth. Slowly, but with increasing speed, the light swelled, transforming itself from deep orange to bright orange and blazing intense flaming yellow.

"Looks like a big one," the pilot said.

The copilot said nothing. He didn't need to.

A Titan IIID from even forty miles away at night is a staggering sight. More than three million pounds of thrust

hacked its flaming cleaver through darkness, sundered the gloom, spilled fire through the clouds, then erupted upward. Away from all visual obstructions now, it became a small sun rejecting the planet that had given it birth. Before the stunned pilots in the jetliner the world burned softly just below them, bright and brighter toward the howling climbing rocket. Far below, the launch pad at Vandenberg Air Force Base spat and crackled as thousands of gallons of water under high pressure slammed against the launch table and the umbilical tower, cooling down what marauding flame had lashed to glowing metal.

But well above them the fire tore at blackness. Suddenly the flame sputtered. Silent gasping in high heavens as the great solid boosters exhausted their fuel. Small white explosions followed as the pyrotechnics blew away the columns of spent, solid rockets. Moments later the core stage of the Titan came to life. Without hydrocarbon fuel in its capacious tanks its ignition was a sudden flare of intense white light, and then only twin searchlight-like circles as the main engines burned with barely visible flame.

The Titan vanished into the maw of night. From the jetliner the two pilots saw the light fading to the brightness of a star, and vanishing amidst the panoply of celestial gleaming.

The special Russian task force, a group of teams spread most of the way around the globe, awaited the launch of the huge Titan booster on the same countdown timeline as the Americans who launched the rocket. Two Russian electronic monitoring satellites had detected and were recording the downrange signals—downrange in this case meant south of the prominence of land jutting from the California coast—through which the launch center at Vandenberg

coordinated the waiting tracking of the great booster. The satellites also picked up the transmissions between Vandenberg and downrange as they were handled by Boeing RC-135 jets flying well to the south of California. The United States maintained several secret tracking sites in Mexico, Central and South America and these also were monitored. As were three tracking ships on the high seas. Russian satellites and Russian submarines monitored the launch site and adjacent areas. Russian ships on the high seas, as well as ground stations at various parts of the world, would assure accurate tracking of the American spacecraft once it entered orbit.

The interest was more than ordinary. Other Russian teams stood by, at the ready, awaiting events. Everything they did must be timed exquisitely—their personal actions, the performance of their own powerful boosters, and a host of electronic equipment. It all hinged on what happened with the Titan spewing flame earthward as it howled into orbit, and then, afterward, along what orbital parameters—height, velocity, equatorial angle and other factors—would be established by the satellite.

The unmanned vehicle that eased into polar orbit was known as the Big Bird. An impressive packaging of electronics, cameras, sensors, tracking gear, radio transceivers, film processing, TV transmitters, and other computer-driven systems with which camera plates might be ejected at desired and specific time-and-place positions during orbit.

Big Bird was an entire podium of military satellite capability. It was able to survey the earth with a variety of cameras. Some of these transmitted their data on TV waves. When far greater detail was needed the heavy cameras aboard Big Bird took their pictures, and the film plates were ejected and deorbited, to be recovered in midair by special aircraft assigned to such missions. But the satellite took its

pictures in normal, blue-and-red light, in infrared and in ultra-violet. It could detect chemical emission of Russian rockets, sniff out radioactive traces, and also cup an extraordinarily-gifted electronic ear to Soviet radio and microwave communications. It was a mixture and the best of former Midas, Ferret and Samos military reconnaissance satellites, as well as adding many new capabilities of its own.

The United States launched one of the forty-foot-long Big Bird satellites every three weeks. More often if necessary. That last didn't happen too often, for the Big Bird was handsomely equipped to fulfill its reconnaissance function for its three-week lifetime.

The Big Bird was the key to continuing spaceborne surveillance of the USSR and other parts of the globe. Its systems permitted real-time reconnaissance, as well as exquisitely detailed photographic and other coverage. The cameras of Big Bird, for example, literally could, from an altitude of 130 miles, read in fine detail the small lettering on the license plate of an automobile.

Each Big Bird mission was a critical element of the continuing surveillance of USSR military capabilities. Both sides—Russian and American—found no disagreement on this point.

And each side understood the importance of such satellites in orbit.

And of eliminating the surveillance capabilities of the satellite.

The Titan booster performed flawlessly. The main core stage, with two engines burned out, shut down. Pyrotechnics separated the spent stage from the live upper stage. Ullage rockets fired to "seat" fuel in its tanks under the zero-g

coasting. Flame blossomed in space as the single engine of the big upper stage ignited, continuing to accelerate the heavy Big Bird into orbit. It was done. The empty stage was jettisoned. Protective panels and sheaths were released and propelled from the satellite. Sensors came alive. The computer stabilization system went into operation, marking the horizon, pointing lenses and sensors earthward. Signals flashed back to tracking aircraft, ships and ground stations. Big Bird was in orbit and performing well.

On the fourth polar orbit the big satellite crossed over the edge of the Soviet Union, slicing an orbital path near Siberia. Russian radar had tracked the satellite. Russian computers knew every detail of its flight and provided split-second timing of its position at any future time and space vector.

The computer indications were noted. At a precise moment dictated by the computer, flame mushroomed from a concealed launch pad. The instant the Russian booster ignited, the sensors aboard the Big Bird satellite noted the flare of energy, sensed and recorded the infrared signature, tracked the accelerating rocket and recorded time and position, angle of flight, and continued acceleration into orbit. The data were kept on tape recorders for burst-transmission at a later point during orbit over the United States.

It was a transmission that would never be made. The Russian booster ripple-fired through several stages. It was overpowered because of the need for possible corrective maneuvers in orbit. The Russian spacecraft slid into an orbital path matching that of the Big Bird satellite. When it was eight hundred yards from the American vehicle, hatch covers broke away from the flanks of the Russian spacecraft. Sensors positioned the Russian ship. One after the other,

propelled by slow-burning solid rockets, a host of missiles using infrared, radar, and direct-sight tracking drifted toward the Big Bird. Three missiles made contact and detonated their warheads.

At Vandenberg Air Force Base in California, a major studied his radar screen and picked up a red telephone that put him through automatically to the headquarters of North American Air Defense Command in Colorado. His call was automatically recorded in the Pentagon.

"They've done it again," he said. "All we're getting on skin-tracking is a cloud of debris. We've lost the Bird."

CHAPTER 5

"You may be schedule to fly at 0900—wheels rolling and off the ground by nine o'clock in the morning, but that's only the tip of the iceberg." Dr. Rudy Wells rousted Steve from the sack at six AM. He did it gently. The morning of a flight in a fire-spewing beast didn't seem quite the right moment for levity.

Wells came into Steve's quarters with two cups and a pot of steaming coffee. Steve sat on the edge of the bed, sipping slowly, while the doctor lounged in an easy chair. The pilot regarded him with silent displeasure. He had always disliked early flight time breaking into his sleep. Now the doctor rose to his feet. "I'll give you six minutes even for a shower and a shave. By the time you hit the dining room, steak and eggs will be waiting. Don't be late."

Steve found Ted Anderson waiting at the table with Rudy Wells. The bearish colonel scratched his beard like a grizzly coming awake with a bad tooth. "Took you long enough. We try to run a tight ship here."

Steve poured fresh coffee. "Stuff it."

"You didn't say sir."

"Stuff it, sir."

"That's better. You young guys got to learn respect for us old heroes."

Steve deserted their banter for the business at hand. "How goes it out there?"

"Everything's on the money," Anderson replied. "They've got the Asp on the Charlie Five. I waited until they confirmed umbilical connections."

Steve nodded as he ate. "What's weather got to say?"

"Chamber of commerce stuff. Light scattered at eight thousand. Some cirrus higher up, maybe around twenty, but that's all. Sharp jetstream, but the main line of it is fifty miles south of where you'll be breaking the laws of flight."

"Sounds good," Steve said.

"I arranged it myself," Anderson said.

Back in the pilots' quarters, Rudy Wells went through a quick but thorough preflight medical of Steve Austin. Medical readings went into a portable computer that fed into a larger cybernetics center at the base. Steve would be hooked up with biomedical sensors throughout his flight that would transmit back an unbroken stream of physiological readings. Anything sharply out of the ordinary would sound its own alarm to Wells and Anderson and to the rest of the support team managing today's mission.

With the medical check finished—and everything where it belonged—Wells turned Steve over to the suit technicians. Ted Anderson lounged in the back of the preparations room, seemingly casual, but missing nothing of what went on. It was old hat to them all but nothing was ever really easy when

you were going to buck heads with the forces awaiting Steve high above the earth.

For a while Steve Austin couldn't hold all his attention on the events in this room. Part of him moved and worked with the suit technicians, but a portion of his thoughts flowed back into the past. How many other times had he suited up just like this? Oh, the suits were usually somewhat different but the basic package altered little. The flight suit for launch in the Saturn V for the ride all the way to the moon . . . that suit, and protective covering, and the portable life-support system on his back for moving along the surface of the moon. The suits he'd worn in testing jet fighters, rocket planes, lifting bodies—all were slightly different but they all did the same job. They gave him an encapsulated part of earth with oxygen, pressure, power, so that if the integrity of the vehicle in which he was sealed gave way he'd still be able to function normally and make it back home to the bottom of the atmosphere, where it rested on the earth's surface.

There was a stark moment of dread, and Rudy Wells didn't need to look toward the biomedical readout panel to know that Steve had gone into a sudden sweat—an action the doctor had anticipated. Ted Anderson saw it as well, but not so much as a glance passed between the two men.

Steve had gone back to that morning when he'd made his last flight in the M3F5, the nasty lifting body that came back to earth with bone-shattering violence. There was no way he could go through this morning without a mental return to that other morning when he'd suited up like this, when he'd exchanged bantering words with Wells, when the weather was right and the sky inviting. That day he'd flown the M3F5 slung beneath the wing of a B-52. Today he'd be

sealed within the Asp mounted atop a C-5A. But all that had changed was the equipment. The upward plunge, the grappling with unknowns were essentially the same, and Steve had no way to avoid thinking about a repetition of what had happened before.

But he didn't dwell on it. He had to take his punishment from his own memory and his imagination of what *could* happen. Once he'd faced the dragon, he was essentially through with it. Indeed, his thoughts had come full circle to giving complete attention to the suit technicians who garbed him in his other-world attire. He concentrated on what was happening here and now. Messing up a mission like this one because your underwear coolant lines were snagged was a dumb way to go.

They wrapped him up in full detail and hooked him into his hand-carried coolant system. Outside in that sun, even for a few moments, a sealed system would begin steaming him in his own sweat. The portable air conditioner would keep his suit flowing with cooled and dehumidified air, and he'd live on that system until they buttoned and plugged him into the Asp.

The chief suit technician stepped back and gestured at the checkout panel. "You're ready for the party, colonel," he told Steve. Inside the helmet Steve nodded. "Let's go, troops," he said to Wells and Anderson.

Again the haunting sense of the intimately familiar walked with them . . . from the suiting room down the long corridor to the doorway where the transfer van, painted blinding white with garish orange dayglo stripes to identify it to one and all. Steve followed Wells into the van, Anderson just behind. An air-police car with flashing blue lights preceded them, and another followed. It was a long drive to the flight line where the monster hulked, waiting.

Even from a distance, looking past the drivers, the two-ship combination was enormous. The C-5A in itself was a massive, thick-bodied giant, set low to the ground on its multiple-gear system, with the broad wings drooping uncaringly. In flight, the dynamics of lift would flex those great sheets of metal, bending them upward so the monster would perform as intended. But as huge as was the C-5A mother ship, it gained in height with the mounting platform imbedded within the upper fuselage, atop which was suspended the gleaming scimitar-winged shape of the Asp. The entire configuration seemed even larger than life-size because of the cherry-picker crane standing by its side. The cab of the elbow-bending crane was a complete, if small, pilot support facility in which Steve and two attendants would be carried to the cockpit level of the Asp.

By now Steve was thoroughly into the element of the flight he was to make. Everything else had been crowded from his mind by his total concentration on what would happen now, in the next few minutes, in the time span beyond that. He thought of the immediate and the immediate future, as he must, if he were to remain in control of the beast he would be flying.

So he was completely unprepared for the unexpected in the form of Dr. Page Rossi, standing by the waiting cab of the cherry picker that would lift him to the Asp. He didn't even see her until he had left the transfer van and walked to the waiting cab. When he did spot her he stopped dead in his stride, the surprise on his face visible even through his helmet.

"Dr. Livingston, I presume?" She couldn't resist.

He stared from her to Rudy Wells. Dr. Page Rossi couldn't hear him, of course, since he was sealed within the pressure suit and his communications were linked directly to

plug-in lines, one of which went to the headset worn by the doctor. Steve's question was blunt.

"What's *she* doing here?"

Wells didn't answer immediately. His reply started from his lips but he held back the words as he remembered that terrible day so many years ago when Steve's fiancée had been *here* on this same flight line when he had taken off in the M3F5 beneath the B-52, and how she had been standing alongside him when the lifting body containing Steve had slammed into the desert floor.

And how, under his prodding, she had vanished from Steve's life. Rudy Wells took a deep breath. "Dr. Rossi isn't here as a spectator, Steve."

"Spill it," Steve said angrily.

"She's here officially."

"Why?"

Wells didn't like the rising temper. He went straight to it. "Dr. Rossi," he said slowly, "has been assigned by the Air Force as your flight officer for the project."

"*Her*?" Again Wells saw that headshake of disbelief.

"*She's* a *doctor*," Wells snapped. "Dr. Rossi is also a lieutenant-colonel in the Air Force *and* a scientist and—"

"All right, doc," Steve broke in. "Just cool it for now. I get the message."

Wells, relieved, told him, "Thanks . . ." And immediately felt guilty—even though under orders—that he could not tell Steve the real reason Page Rossi was flying with him, a reason dramatized and given new urgency by the fate of the Big Bird reconnaissance satellite recently monitored by NORAD and more than routinely noted at the Pentagon.

"Put the headset on the *doctor*." Steve's abrupt request was a welcome intrusion into Wells' uneasy thoughts. Steve

waited until Page Rossi had on the headset. "Can you hear me, Dr. Rossi?"

"Yes."

"Where will you be during this flight?"

"In the drop aircraft, colonel. We have a full simulation monitoring for the mission."

All business, he thought. "Okay," he said. She had started to speak but he disconnected the communications line and started into the lift cab. Wells and Anderson followed quickly.

By the time the cab had reached the cabin level of the Asp Dr. Rossi was dismissed completely from Steve's mind. His concentration, when the hardware of the moment stared him full in the face, was total. It was a shift of mental gears to being the complete professional. He moved carefully from the cab to the front cockpit, Ted Anderson assisting him. Once in the seat, Steve connected his suit systems to the spacecraft. A long, studied glance showed him the power flow and pressures that brought life to the gleaming spacecraft. There was no hurried move on the part of Anderson to leave. Each man went through a long checklist, and as they went back and forth in their detailed checking off of one item after the other, a ground crew followed every move, as did the monitoring team within the capacious interior of the C-5A.

There would be further checks during the climbout to drop altitude, but for the moment the preparations were complete. The Asp was alive, and Steve Austin was one of its major elements of life. The checklists were put aside. Ted Anderson leaned forward into the cockpit.

"Don't forget to wear your galoshes, boy wonder," he told Steve.

"Only if it rains."

Anderson hesitated, touched Steve lightly on the shoulder. Then he stepped back into the cab, watching as the canopy came forward and locked into place. Steve got the green safe light on the panel and gestured. Anderson spoke to the controller on the ground. "Take her down," he said. Moments later he stepped out onto concrete. He looked up. Somehow that scimitar-winged thing was different now. Very different.

That was his friend inside. A man who'd been savaged by the very same forces to which he was about to return.

CHAPTER 6

Metal gleamed before him, a sea of aluminum. The thick and rounded forward sections of the huge C-5A were trembling gently as the great wings flexed with their loads through the lower stratosphere. Long before this moment Steve Austin had lowered the sun visor of his helmet. With each trembling motion the dazzling sun reflected across the metal, sending bursts of blinding light directly into his path of vision. It wouldn't take long to get sun-blinded that way, and having only one eye (despite the range-finding system incorporated into the other socket) didn't help matters.

The C-5A would take him to 41,000 feet, where it would hold level cruise, and they would go through precisely fourteen minutes of final checkout. For the moment, however, Steve was content to increase his "feel" of the Asp, to keep looking at controls and gauges, to accentuate his sense of being completely at home within the slash-winged spacecraft. You never got too much of that.

They leveled off at 41,000 feet. Steve checked his in-

strument readings with those of the C-5A; it was an excellent final test of the gauges he would use in atmospheric flight. Indicated airspeed, mach number, altitude, rate of climb, outside temperature, magnetic compass, gyro compass; he went slowly and thoroughly through the check, calling off the numbers to the flight engineer in the enormous machine below him.

"Three minutes to release, Colonel Austin." The voice of the drop officer in the C-5A. Steve smiled to himself. Funny how they kept the old terminology, even though it didn't apply accurately now. When he flew the M3F5 lifting body he literally dropped—fell away—from the underwing pylon of the B-52 mother ship. But this time, since the Asp rode on the dorsal mounts atop the C-5A, it would be the ponderous whale of the supporting aircraft that pushed back toward the earth.

"Roger three minutes," Steve confirmed receiving the message.

Even as he said the words he saw the horizon begin to tilt. They were making their final turn, a swing of ninety degrees to the west from their southward track to get into launch position. As they turned he checked the artificial horizon, the gyroscopic ball that would give him attitude data whether he flew in the atmosphere or through vacuum.

The big airplane rolled out easily, but caught a trail of turbulence. The whole assembly rocked through its structure, a strange, sofa-cushioned absorption of disturbed air. The C-5A didn't ride turbulence like other aircraft. It pushed and bulled and wallowed its way through, and took away a lot of the sting that accompanied B-52 flight through the same kind of air. He pushed it all from his mind. They were rolling out now.

"Two minutes."

"Two minutes. Okay," Steve responded.

He was going through the final checklist. Pressure building up within the belly systems of the Asp. At ninety seconds before drop he was fully on internal power. "Umbilical disconnect," he ordered.

"Yes, sir. Umbilical disconnect."

Steve felt the slight *thud* as the main power cables from the C-5A pulled away from the belly of the Asp, and the panel access doors snapped shut and sealed.

At minus one minute she was primed and ready. The drop officer called it out and Steve confirmed. He got radio confirmation from the chase planes, and glanced to both sides to see the big RS-71 Blackbirds, each leading a thick plume of contrail. As he left the C-5A they'd go to full power and stay with him in staggered, leap-frog formation as long as they could to watch every move.

The checklist swept along. Radar confirmed green all the way. Tracking aircraft in position. Rescue aircraft in the air and circling. Final weather check. It was all in the slot.

He acknowledged the count at thirty seconds. That would be his last verbal response to the count. Now he was part of the Asp, linked through the feelings in his gut to the spacecraft. His gaze swept the panel, seeking any discrepancy, any fault, any wavering. She was rock-steady. His right hand tightened, then relaxed to exactly the needed pressure on the stick. His left hand gripped the throttle quadrant, ready to move.

They began the familiar counting back at ten seconds to release. Steve made no comment, but a part of his brain stepped along with the receding seconds. At four seconds he braced his body against whatever unknown that might happen when the two winged monsters separated.

"*Drop*!"

Not his drop—theirs. At the call, explosive charges sliced away connecting bolts that had held the two machines together. They felt the blow through both aircraft. At the same instant the pilot of the giant C-5A went forward on his control yoke in a smooth, steady motion, dropping the nose and pushing the mother ship into a descent. This maneuver had to be timed perfectly, and smoothness in executing it was critical.

In the Asp, Steve held his controls steady. He had already trimmed in the pitch mode for a slight nose-up position. He watched the sea of aluminum before him drop away at the same time he brought in slight right rudder and stick, angling the Asp to the right and away. Below him and now to his left the C-5A continued its descent, clearing the area. Steve held his gentle turn only for fifteen degrees, then rolled out. He was now precisely on the track for bringing in power. Again he tensed and cracked the throttle forward into the detent where electrical current surged through the propulsion system.

A giant yet strangely soft fist slapped his entire body as the big engine behind him ignited. Acceleration was instant but smooth, and he kept his eye scan moving from the propulsion system gauges to his flight-instrument readings.

"Clean ignition," he called.

"Confirm that, Asp," sounded one of the chase pilots. "You have a clean flame. Shock diamonds visible. You're go from here."

"Roger that," Steve called back.

His left hand moved forward just a hair. Fuel gushed through lines, met in the combustion chamber, kicked back a streamer of longer flame. Steve grinned. He couldn't help it. There wasn't anything like this. Not even sitting atop that huge volcano they called the Saturn V could match the

feeling of power at his fingertips in the Asp. Nearly eight million pounds of thrust in the moon-boosting giant from Pad 39 at the Kennedy Space Center was the greatest manned push ever known, but you just *sat* there, and you waited, and computers ran the show, and you really didn't have the feeling of building to on-rushing speed. Sure, the Saturn V and its stages kicked you along to nearly 4-g, and mashed you into the couch, and you went through successive tailoff of engine burn, being hurled forward at engine cutout, momentary weightlessness, and then another kick in the tail when the next stage ignited. But you were a *passenger*, and the longer those great engines howled the more fretful you became.

Not in the Asp. You had throttle control. You moved that handle under your left hand, and you squeezed fire from the big combustion chamber behind you as if you could spray water from a high-pressure nozzle. And if you kicked the tires real hard and let the dragon loose it would slam you back against the seat and the headrest hard enough to make you remember it for a long time, because on a comparative basis you had far more rocket push in the Asp than you ever did in the Saturn V. The giant booster was a Cadillac, but the Asp was a snorting hotrod, and it could give you a run for your money like nothing had ever done before in this business.

The Asp engine could be throttled from the low end of the gate at 10,000 pounds thrust all the way up to 200,000 pounds—and the high end of the scale was the same push as they'd had in the S-IVB third stage of the Saturn V. But the Asp carried only a fraction of the weight of that bigger rocket, and so it snarled louder and bit deeper.

Steve read the gauge showing the fuels well-seated in the tanks. The opening acceleration and the gauge readout prom-

ised him no problems of tank cavitation or bubbling, which meant smooth pressure throughout powered regime. He nudged the throttle forward and flame increased. He still had enough atmosphere about him to use the aerodynamic controls. There was an automatic sensor and compensating system built into the Asp. Whenever he moved the aerodynamic surfaces through full range and the Asp failed to respond, the thrusters came into use, guaranteeing him control response without him bothering to shift from one system to another. For the moment, as he accelerated steadily, there was enough "bite" of his aerodynamic surfaces into the surrounding air for the Asp to function as an aircraft, despite the howling fire behind him.

He came back further on the stick as he increased power. The chase planes were still with him, but as he continued to fire he knew he'd reached their limits. They didn't bother calling in that they were falling behind. The increasing curvature of the horizon and the swiftly darkening sky above told him all that without their confirm.

He enjoyed, even relished, the feeling of leaving behind the hottest-flying airplanes in the world, his own power and increasing speed turning into slow minnows the great black shapes that had until now kept pace with him. Then he forgot the chase planes and everything else except the machine in which he was sealed, and the vacuum waiting directly before and above him.

He was up to 30,000-pounds thrust, still increasing power, still a ways to go with the back pressure on the stick. He felt the first tremble of the rocket thrusters coming into play, which meant that the air was thinning so fast now the aerodynamic controls were locking into place as a fixed part of the machine. The Asp was a whole quantum jump ahead of the old Gemini and Apollo spacecraft, where the thrusters were used directly for attitude control. Steve Austin *flew* the

Asp as if it were an aircraft instead of a machine controlled in attitude by thrust reaction alone. A computer system within the belly of the machine sensed the stick motions and translated them into short or longer bursts of rocket thrust that corresponded to the stick movement.

By now Asp was really off and running, the sky turning into that familiar black he knew so well, the edge of the earth falling away to his left and right in the increasing curvature.

The pressure kept him glued comfortably into the seat, and along with the constant acceleration he could feel the pressure in his suit increasing. He did laugh aloud at that; his tolerance to g-loads was much superior to that of other pilots. After all, he didn't have to worry about the blood pooling in *his* legs! In the "old days," before the crash and the subsequent medical adjustments had transformed him into a bionics being, he had suffered the same problems of bladders squeezing his legs and thighs to maintain his tolerance to crushing g-forces. Now, if any man had ever been equipped, so to speak, for this business, it was Steve Austin.

He was still on the belly part of the upcurve, and he was grinning with the sheer, heady delight of his howling rush into vacuum, but now he was about to get into a whole new ball game. Because this wasn't just another rocket-pounding ride into the environs of space—the purpose of this flight was to *fly* this machine.

He flight-maneuvered now as he'd never done before in his life, easing the Asp into the entry for what would be the grandest loop ever flown by any man, in atmosphere or out. He kept the power steady now, though still keeping the nose in its gentle rise. He knew that the constant curve was too much now even for the attitude thrusters, and that the great engine far behind him was gimbaling in its mounts, shifting position from his line of thrust to hold the maneuver he was commanding into the ship.

And then he was hurtling away from the earth on a vertical line, straight up, and still he held in that power, the g-forces now thickening him against the seat.

The Asp was a thing of power, and beauty, and it flew like a dream, coming now *through* the vertical, the nose coming back and back until he was climbing in that position, on his back, inverted, the flaming thrust behind him spreading into a huge plasma sheath as ionized gases fled in all directions from the shockwave-studded flame.

By now he was in the attitude the big shuttle spacecraft would eventually fly when it climbed away from its launch pad under the thrust of huge solid boosters plus its own engines. He held the Asp in the maneuver, the world crazily upside down and hanging at its steep angle.

Now he really poured it on, demanding total performance from the scimitar-shaped beast, feeding in just a bit of additional thrust from under one wing, opposite thrust from the topside of the other wing, and Asp was rolling slowly, smoothly around its axis.

It was a wild and a magnificent maneuver, but the thrust from the blazing engine behind him now was linear, and he stopped the roll when Asp was right-side-up, the angle still lessening, but the thrust still so enormous he felt himself lifting from the seat, his body taut against the restraining straps.

Now he hurtled toward the Pacific Ocean and scanned the radar altimeter and listened to ground control calling in the numbers.

Altitude forty-eight miles.

Nine thousand miles an hour true speed.

If he cut power now he'd end up somewhere on the far side of the Pacific. But he had no intention of letting that happen.

It was time for the *real* test.

CHAPTER 7

At this high level above the planet the attitude of the Asp had no effect upon its path of flight. Beyond the atmosphere, it didn't matter if the Asp flew arrowed along its course, or flew sideways, or rolled slowly, or simply tumbled end over end. It was moving along a ballistic trajectory and, unless attitude control were being exercised by its pilot, the Asp was no more than a mindless chunk of gleaming metal rolling aimlessly in attitude, but soaring along its precise, high-reaching arc above the planet.

The pilot within the powerful machine had no intention of turning his flight into this sort of meaningless tumble. He was here for a purpose—the moment for putting the scimitar shape through its most grueling paces was at hand.

He concentrated on the instruments. The world—real and artificial—centered on his gyroscopic horizon, a sphere marked with reference lines that told him exactly what his attitude was in reference to the earth's horizon. Another instrument, which was used only for reference purposes, was

a flat grid marked with latitude and longitude on which the position of the Asp was indicated by a glowing light. But it was the gyro horizon, what Steve called the 8-Ball, that was his whole world.

Now he needed to change the attitude of the Asp, to reverse the spaceship's position along its path of flight. He was racing along a great ballistic arc and what he did with the attitude thrusters would have virtually no effect upon the looping path away from the planet and along the curve back down. At the moment the Asp was like an arrow pointed along its path of flight; Steve had to change the attitude so that the powerful engine was pointing in the direction of his movement.

It was, essentially, a simple maneuver, the kind he'd performed so many times with the Apollo spacecraft. He brought in the thrusters, and tiny fingers of flame spat in vacuum. The Asp began a slow tumble nose-over-tail, its hurtling speed unaffected by this rotation. Steve, indeed, was weightless throughout the parabolic arc except for those moments when he was using rocket thrust. He watched the horizon of the planet shifting slowly about him, as if the Asp were standing rockstill, and the world itself moved slowly through a complete flip. Then the 8-Ball showed him coming around and when he had it right on the nose he tweaked the thrusters again, stopping the tumble.

Now the engine pointed in the direction of movement, and Steve faced backwards along the route he was flying—staring down at the magnificent panorama of the western coastline of the United States and Mexico. The Pacific Ocean gleamed like a flowing tide of quicksilver, and the land masses spread before him with startling clarity, like a relief map illuminated by bright sidelights. He had himself a treasured few moments simply to look. It was the one

luxury he never passed up when he'd lifted himself, body and soul, beyond the atmosphere.

All was now a combination of eyeball and computer. He needed to hold the Asp precisely on its present attitude, but there wasn't any need for him to play superpilot. The computer had its role in this. He punched in the numbers so that the computer would fly the attitude thrusters, would hold attitude, would initiate engine burn and hold the firing stud open until the desired reduction in velocity had been achieved; then it would shut off ignition and present to him in glowing digits the results of this activity.

He finished keying the computer and studied the glowing panel. There was one more safety. Mission control came in.

"We've got matching readout, Asp," came the call. "You are go for your burn in seventy-five seconds."

"Very good, flight."

"Punch in autosequence for minus fifteen, please."

Steve tapped the keyboard console. The warning light came on. Fifteen seconds before ignition time the computer would take over the Asp. In this sequence Steve would ride the ship as a passenger, but with one gloved finger hooked around the emergency switch to shut down everything if the pattern of events came unglued.

"Thirty seconds to ignition. Ten seconds to autosequence start."

"She's clean and green, flight."

"Nice to hear, Steve. You should get your autosequence initiate light . . . now."

"Got it."

"Ten seconds to ignition."

"Here we go again."

"Coming up . . ."

The seconds flashed away.

A mule kicked him in the stomach.

The blow of the engine ignition caught him by surprise. He had relaxed so completely within the Asp that he'd forgotten to hang on for that extra moment with tightened muscles; he grunted with the over-all punch of deceleration. He grinned at his own reaction. Feeling a ship come alive like this was also a tremendously exhilarating experience to Steve, and he made the most of his emotional and physical response. He also kept his eye glued to the panel, reading fuel pressures and flow, the thrust of the main engine, the g-forces as they came in and stabilized, and the steadily decreasing velocity. Then the final seconds were rushing away and he heard the flight controller coming in scratchily because of the enormous plasma sheath howled outward by the engine.

"Ten seconds to shutdown."

"Got it. Counting."

"Standby manual deboost."

"Ready."

"Five seconds. Coming up on . . . shutdown."

A thundering crash of silence. The explosive end to engine firing shoved him away from the seat, against the straps. A diving-board leap into zero gravity.

"Confirm shutdown. It looks like everything was on the numbers, flight."

"Roger that, Steve. We read your altitude as five seven miles and your velocity at one four zero zero. Sort of slowed you down a bit."

Steve smiled. "A real set of concrete grabbers out there," he said. "Looks like my computer agrees with your computer."

The flight controller had been in space before. "How's it look outside, Steve?"

He pulled his attention away from the instruments. "Incredible," he said quietly. "Absolutely incredible."

It was that. For now he was catching up with and was in the midst of an enormous plume of frozen gases spattered away by the engine, billions and billions of fireflies lit by the sun, and, as each one turned or rotated or whirled or tumbled, it caught the sun and reflected it back in a swirling snowstorm of kaleidoscopic color. One moment he was in the center of a galaxy, then he was thrust magically into the heart of a technicolor snowstorm—fireflies and dancing motes, gleaming and glowing, twinkling and glittering all about him. It was a rapture of visual delight that stunned him, but even while he stared through the canopy the lights faded as the sun angle began to change.

"Asp, this is flight. You read?"

He shook himself from his reverie. "Five by, flight. Just rubbernecking a bit here."

"Understand. You ready for games, Steve?"

He studied the panel. The Asp was at the peak of its trajectory, still decelerating. Only moments later he reached the top of the arc, and they were on their way down now. But his position over the earth, and his low speed, meant he'd never be able to make it all the way back to the dry lake beds, where he'd bring in the ship. Well, they'd planned it that way. "Games" was the acid test.

"Batter up," he confirmed to flight control. From here on in the ground mission controllers would stay out of his hair. Part of the test was to assure that an Asp pilot, using onboard systems only, could play the game on his own. During this test flight, if anything went seriously awry, mission control would be all over him in an instant, calling out warnings and corrective maneuvers. Otherwise they would leave him strictly on his own, letting him call the

shots, playing it his own way. What happened during this transition was what they wanted to find out.

He was downsliding now, the Asp falling out of the wispy tendrils of atmosphere, mushing back down to the waiting ocean of air—but air thick enough to transform Asp from a spacecraft into an aircraft was still far below him, and he wouldn't be substantially out of vacuum for some time yet.

He brought down the nose with the thrusters, watching her descend on his instruments, judging from the gauges and the visual cues of the earth itself. Time to bring that big job behind him back to life.

He eased in the throttle, and the computer system, slaved to the control stick within his right hand, followed the stick movement. Fire boomed behind him and the engine gimbaled in response to the stick. He held the power at 10,000-pounds thrust and eased back on the stick. Now he was accelerating back into the atmosphere, but along a flat trajectory, the nose only seven degrees below the horizon. Most important to this part of the flight test, he was holding an angled thrust from the engine. He checked the timer and slashed power. The thrumming roar through the Asp's structure cracked away with a bang, and his body tugged forward against the harness in the sudden absence of acceleration.

So far, so good. He would dearly have loved to fly this beast the way he flew an airplane much farther down, but it was no-go at this altitude. He would have to work a series of power bursts and constantly changing headings. He forced himself to relax. Despite that long burst of power, Asp was still plunging back into the atmosphere and—

The .05-g light flashed on. The first bare touch of deceleration from thickening air. What he'd been waiting for. He could feel the first slight touches of buffeting—no more than

the mildest brush with thin-air, high-altitude winds, but enough to give him aerodynamic *feel*.

Time to let the ground people earn their day's pay. "Flight, your computer still talking to my computer?"

"Rog that, Asp."

"How we doing on radar vectors?"

"Holding hands, Steve. We have agreement between both systems. You're go to proceed using your onboard readout."

"Very good, flight."

Far ahead the Pacific Coast lay beneath a blanket of low thick fog, but he could see the mountain ridges clearly and the pale brown of the desert far beyond. The way he was flying now, increasing air thickness grabbing at his speed, he'd never make even the coastline. Which was another acid part of the test flight; to show the capabilities of the machine under just such a condition. There wasn't any use in going halfway. If they were going to get what they finally needed, Congressional spending to back the manned-flight capability in the space program, they needed something more than projection charts to sell their case.

He was down to 60,000 feet, barely supersonic, falling like a graceful arrowhead, when the computer blinked its message for more power. This time he would go for a short, sharp jolt rather than an extended power run.

He checked the electrical systems, confirmed that the engine was hot and brought in the throttle to minimum detent at 10,000-pounds thrust. With a clean engine burning behind him he advanced the throttle quickly until it read 90,000 pounds. The jolt slammed him back into his seat, and even as the pressure squeezed him he was coming back on the stick, flying the beast by the 8-Ball before him, coming up very sharply. At sixty-five-degrees climb he had the velocity,

angle and altitude called for by the computer. He cut power.

Now he was on a new ballistic arc, much less severe than what he'd flown before. He let the Asp coast to the peak of its trajectory, and when it started down he used the attitude thrusters to assure coming back into the thickening air with the Asp's attitude matching his path of flight.

He came over the mountains at 70,000 feet, the Blackbird chase planes winging swiftly after him on either side, calling out their position. His course took him over a restricted area. "Asp from Chase One, you're coming up on fuel dump. Sixty seconds, Steve."

"Got you, one. I'll call it out."

"We'll be waiting."

A light flashed on the panel. He hit the fuel-dump switch and a torrent of unused hypergolic fuel was turned into thin spray by the speed of the Asp. It took forty seconds to dump the remaining rocket fuel. Much lighter now, the Asp handled like a high-speed glider. Still a tricky article, but a lot nicer to fly than that grotesque bathtub that had—

Angrily he shoved memories from his mind, ordering himself to fly *this* iron bird.

"Fuel dump completed, chase one. How are the doors?"

The Blackbird had eased in closer and the man in the back seat studied the Asp through binoculars. "Asp, confirm fuel-dump doors closed. You're clean." A moment's pause. "You'll be coming up on start of pitchout in two minutes. You ready for the gear?"

Steve judged height and speed and position. "In sixty seconds, one."

"Okay."

One minute later Steve hit the gear lever. The Asp, still descending, shook and rumbled as the doors snapped open

and the low-set tricycle gear extended into the air. The doors closed.

"Panel shows three in the green, one. How's it look to you?"

"Three down and locked, Steve. Pitchout in thirty seconds."

"Got it."

His apprehensions vanished in the sweet response of the scimitar-winged machine to his hands and feet. He rolled into a vertical turn, sweeping cleanly from the sky, coming around into the wind, lining up on that long black stripe across the desert floor, the chase planes easing off their own speed on either side and above him.

On the ground, Rudy Wells and Ted Anderson, and every man and woman who remembered or knew of that crash so many years before, tightened muscles and held their breath.

But there was no sudden jolt, no bounce, no scraping wingtip. Steve brought the Asp back from space in a sighing glide, held her off the desert floor as she painted herself on, the wheels kissing the ground without a jolt.

Inside the cockpit, rolling to a stop, Steve Austin smiled to himself. He felt wonderful, ready for anything. Which was exactly what they had intended. . . .

CHAPTER 8

Everyone wanted to celebrate.

The flight-dynamics people were ecstatic. The Asp had outflown their predictions, both in atmospheric and vacuum mode. Every system had worked perfectly. Transitioning from aerodynamic forces to the special demands of thruster control in vacuum had gone without a hitch. The interference area—just when the controls were a bit of both—had been anticipated but the compensation factors designed to attend to the problems during transition worked as planned. The Asp flew as if born for that strange half-world of thinning atmosphere and encroaching vacuum.

More than anything else, the mission vindicated the flight people who had been saying for years that a *spacecraft* could be *flown* instead of just pushed and jostled around, imprisoned by the invisible web of centrifugal force. The Asp hadn't flown into orbit yet but that only awaited the decision—Steve had never pushed the big engine beyond

90,000-pounds thrust, which meant there was still another 110,000-pounds thrust in the can waiting to be unleashed.

There was still another factor—cost. When you added up a sequence of orbital missions to be flown week after week and year after year, the Asp was years ahead of even the big NASA shuttle. When you flew the Asp the only thing you expended was fuel. Even the shuttle had to dump that huge fuel tank and let it burn up on re-entry. And the great solid boosters that NASA hoped to reclaim after they were found floating around in the ocean involved a laborious, expensive process of reclamation and refitting. Besides, what NASA said in its press releases about recovering the great shuttle solid boosters, and what the engineers thought privately, made for two completely different stories.

After they'd rolled the Asp back into the hangar, Steve Austin underwent a detailed medical examination by Rudy Wells and several flight surgeons, including one liaison surgeon from NASA. Steve also spent two hours talking to several pilots who ramrodded questions at him about every detail of the mission from the cockpit viewpoint. Everything Steve said to the group would then be run off against the recorded data from the flight to be sure nothing be left undone in behalf of spacecraft improvements.

Flight Dynamics also had some questions for Steve about the boost phase. The Asp in its current configuration could make low-earth orbit, but not a high orbit, especially with a full load aboard. They were still working on an improved vehicle but that was some way down the pike. In the meantime, a full-manned polar mission—never yet flown—was being readied at Vandenberg Air Force Base using the big Titan 3X booster. They needed to talk with Steve about any problems in mating the Asp with the giant rocket.

Steve, more tired than he realized, looked forward to his own break in the debriefings, which at times were more exhausting to him than the actual mission. A man went through a letdown period after a mission. Part of the time when you were flying, especially during the more critical moments, you were moving adrenalin through your system like water through a hose, and the reaction afterward was the body's need to just knock it off and get some rest.

So he was totally unprepared for what came after the technical debriefings and the high-energy meal prescribed by Rudy Wells.

"More debriefings? I thought we'd wrapped it all up."

"It's not about Asp," Ted Anderson said. "Not the last flight, I mean."

"What *do* you mean, Ted?"

Anderson made sure not to glance at the doctor before replying to Steve. "We have a session with Dr. Rossi."

"Her again?"

"And someone else."

They left the mess and returned to the conference room. Steve's surprise showed on his face as he encountered Oscar Goldman. The OSO man nodded, a smile on his face. "I know," he said by way of greeting, "you're also the last man *I* expected to see this week."

Steve slid into a chair. "Oscar, I ought to know better than to be surprised by anything that involves you." He studied Goldman. The same dark suit and narrow tie, the hair thinning neatly on his tanned head, the lithe movements acquired during a career of undercover and action. Oscar looked more as though he belonged in an ad agency on Madison Avenue or in a bank than in the job of number-two man of the Office of Special Operations. Why would Oscar be *here*? Steve was actually back on full duty as a colonel in

the Air Force. OSO had relinquished its hold on him for the period the Air Force wanted Steve to help develop the Asp as a true space vehicle.

And there was the matter of Dr. Page Rossi. She *was* a beauty, about twenty-eight years old, he judged. She was wearing a flight suit and . . . Rudy had said something about Page Rossi being a lieutenant-colonel in the Air Force, and sure enough there were faded silver leaves sewn to her suit. But he couldn't figure the pilot's wings. He started to ask, but stopped as Dr. Rossi, shuffling papers, asked to begin the special debriefing.

She didn't waste time. "Colonel Austin, knowing what you do of Soviet manned-spacecraft capabilities, could you, in the Asp, outmaneuver the latest Soviet spacecraft?"

"There's no direct answer to that, Dr. Rossi. It's like comparing apples and oranges."

"Why?"

Steve leaned forward. "You might as well ask me if the C-5A at full gross weight could outmaneuver an F-4 fighter."

"I wouldn't ask such a question."

"Why not?"

She was startled. "Well, because it's obvious the F-4 is the superior aircraft."

"It's not obvious, and you're wrong. The F-4 is superior in turning-ability, climb, and altitude, but the C-5A is superior in load-carrying ability and range. The word 'maneuver' has different connotations. If you tried to match the F-4 carrying a load against the C-5A you'd never—well, you'd mash the tires flat and still nothing would happen."

"You're rather involved in semantics, aren't you?"

"I am, doctor, because unless you ask questions in precise language, we're going to be carrying on two completely different conversations."

She nodded. "My apologies. You're right, of course. How would *you* ask me the question, then?"

"It depends on what you're trying to establish. The Apollo, for example, could outmaneuver the Soyuz in many ways. It carries much more fuel in the service module, which means it can afford to waste fuel and make expensive—expensive in terms of energy usage—maneuvers. It has enough fuel to make drastic orbital and plane-change maneuvers. It also has a better thruster system, and there's more manual control. Compared to the Apollo, the Soyuz is a truck that can hardly get out of its own way."

"And what," Page Rossi asked carefully, "is your comparison of the Apollo to the Asp?"

"We're on the same wave length now, doctor. Let me put it this way. The Asp is every bit as advanced over Apollo as Apollo is over the Soyuz."

"What about their new spacecraft? The one they call Storm."

"I think they're into public relations. Storm *sounds* great but—"

"From what I understand, colonel, it's a quantum jump over the Soyuz."

Steve shook his head. "Their second-generation spacecraft, Voskhod, was simply a modified Vostok. They stretched things and moved them around so they could cram two or three men inside a sphere originally designed for one man, but essentially it was the same ship. Their real second-generation spacecraft, at least to me, was the Soyuz. They went to separate compartments, to the same type of heat-shield reentry system we had on Gemini. But even Soyuz has limited maneuvering capabilities. It's more automated than it is manual. The new ship, Storm, is essentially an upgraded Soyuz. It's *not* what we could honestly call a second-generation or a third-generation vehicle. Look, we

modified the old Apollo in case we had to use it as a rescue spacecraft. We could take out a lot of stuff and we could put six men in there safely. That represents a hundred-percent increase—a doubling—of the original capability for carrying people. Do you see what I mean? All we changed was the arrangement of internal space. We didn't increase volume. Now, the Russians have increased volume when it comes to stepping up from Soyuz to Storm. I'm sure they've modified their systems and it's a better ship than Soyuz. But its main purpose is to operate as a truck—to carry heavier loads *or* to accommodate as many as six people. I still think the old Apollo would come out best in the ability to function in orbit if you're considering orbital changes and plane changes."

"And you still feel Asp is a quantum jump over Apollo?"

"I know. I've flown both ships. Asp is a sweetheart."

"Could Storm maneuver the way you can in Asp?"

"No way. It's like trying to dogfight an overloaded barge with a lightweight."

"What if you had to try to destroy a Storm with the Asp?"

The question was abrupt. They had weapons-capability in Asp—it was one of the better-kept secrets of the whole program—but he didn't understand a doctor having that sort of information. He looked at Ted Anderson.

"I wanted Dr. Rossi to complete her questions before we went any further," Anderson said. "I didn't want to prejudge your answers to her questions. Dr. Rossi was concerned that you might anticipate what she wanted to find out, that your knowing her role would lead to your prejudging her questions."

Steve spun about in his chair and faced her. "If you don't mind, doctor, just tell me what it is you want to know and.

save your classroom psychology for the lieutenants and the cripples.''

''You have no—'' Then she interrupted herself, took a long deep breath, and came at him with a staccato burst of questions.

''If you had a confrontation with a Storm spacecraft, as compared to one against the Asp, would you be more likely to come out on top?''

''There's no flat answer to that. If I flew a Spad and had the drop on a Mustang I could cut it to pieces. You've *got* to be specific about circumstances.''

''If all things were equal?''

''Put your money on the Asp, doctor.''

She nodded. ''The Asp would be configured for a variety of weapons. Would you choose one over any other type?''

''Again, depends on circumstances.''

''If you were in matching orbit with a Storm and each ship was trying to destroy the other, would you prefer homing missiles?''

''No.''

His answer surprised her as well as the others in the room. Steve noticed the first stirring of Oscar Goldman.''''Why not, Colonel Austin?''

''A homing missile needs a lot going for it. You can block it with electronic countermeasures, with ECM. You can counter it with missiles of your own. You can put up a metal shield—you only need a space of a few inches between the shield and your own ship to eliminate impact. A meteoroid shield works on the same principle. The rock destroys itself against the shield. If a missile detonated away from the surface of the ship, well, you don't have any blast effect going for you. A concussion grenade in space is pretty useless. Its whole purpose is to create an enormous overpres-

sure and send out shock waves. But if you haven't got any atmosphere to heat up and expand you haven't got a shock wave. Keep in mind, doctor, even an atomic bomb going off in vacuum makes no more noise than two snowflakes meeting in the night."

She smiled at that. "I think we can rule nuclear warheads out of this discussion. What about a shotgun pattern with small rockets?"

"If your ship can react fast enough you can get out of the way. Acceleration factors, timing, and so forth . . ."

"Say that again, please? About reacting, I mean."

"If you fire rockets, a lot depends upon their velocity and their shotgun pattern. You've got to be matching orbits almost perfectly to have a reliable effect with that kind of weapon. You're limited in payload so you'd want the biggest pattern for your effort. If your ship, which in this case I assume is the Asp, has powerful thrusters and immediate-reaction capability and enough fuel to play those kinds of games, you can literally thrust away from the incoming shotgun pattern."

"Could *you* do that with the Asp?"

"If I had some room and some time, but not much of either?" He rubbed his chin. "I guess I could give it a pretty good shot . . ."

She looked quickly at Anderson, then turned back to Steve. "What about lasers?"

"Forget them, at least at this stage of the game. Your power output demands an enormous generating system. Room, power, mass—they're all problems you can't ignore. And you've got to keep your target rock-steady for a while. Even a jiggle cuts down enormously on the effectiveness of a laser beam."

"On a general basis, Colonel Austin, trying to anticipate the many factors that might be involved, what would be your choice of ordnance for a spacecraft like Asp?"

"*Two* systems. Homing missiles for a long-range shot, homing to be accomplished by laser-beam guidance . . . the Smart Bomb principle, but bearing in mind the *specific* problems with this system I've mentioned."

"And the other?"

"Machine gun."

"What?"

"Machine gun. Not the Gatling types with a rotating barrel and high rate of fire . . . I'm talking about the old-fashioned machine gun. Best type would be drum-feed instead of open-belt for the ammo." He kept on, knowing he'd surprised them with this choice. "Automatic-homing system, most likely laser beam but with auto cutout for ECM interference, and go to direct optical. The best size would be thirteen millimeter. But you'd use a light-weight design, and you'd want to house the weapon in an external bay to accommodate the heat."

"Thirteen millimeter? I've never even heard of something like that," Page Rossi said.

Steve shrugged. "Thirteen millimeter is the same as sixty caliber. We were using those back in the second world war. Outfitted a couple of fighters with them, in fact. We didn't use them in mass production because the old fifty caliber was so good and we needed lots of fifties in a hurry."

"I really didn't expect anything like . . . well, like an old-fashioned weapon to be your choice, Colonel Austin."

"I didn't think you would, doctor, but when you get right down to it we're still producing and stocking old-fashioned weapons. Napalm, for example, is pretty much the same as

Greek fire, if you stop to think about it."

He turned away from her to face the OSO man, Oscar Goldman. "Okay, Oscar. Enough of the doctor's q-and-a session. Now kindly tell me what this is all about."

CHAPTER 9

"They're kicking in our brains, knocking out our military reconnaissance satellites. *That's* what it's all about. For the past six months we've been increasingly blanked out in our surveillance operations over their territory."

Steve didn't ask Oscar if "they" meant Russians. It was pretty obvious. "Go on," he said to Goldman.

"All right," Goldman began quietly. "I'll try to lay it all out—right up to the end point. Which, as I expect you've guessed, is you. We all know we're on the edge of the first American-Soviet space mission. ASTP—Apollo-Soyuz Test Project. *Everyone* knows about it, it's been front-page for two years now. Our people go there and munch on sturgeon and their people come here and stuff themselves on hamburgers. Very nice. Shaking hands across the polar cap. And it *is* a good thing for them and for us, because at least while we're busy doing this some of our energy is diverted from making ready to clobber one another.

"Unfortunately, it's also pretty icing on a not-so-pretty

cake. In other words, it's also very much a big show. Our government sees two sides to this joint space project. Publicly, we're out there together. Privately, we're beginning to wonder if we're not being taken for a sleighride, with, if you'll forgive me, a troika up front.

"Look, I don't need to go into the standard orientation lecture on our military reconnaissance satellites. You all know enough about our reconsats to realize that a major key to maintaining the latest style in survival—detente—is the efficiency of the reconsats we launch. And those that *they* launch. We've both been doing this since the early 1960's. For a good while we had the edge. First with the U-2's and then with those big-winged RB-57B photo aircraft. But even cruising at 105,000 doesn't insure invulnerability; the satellites, once we began to improve their systems, became more efficient than even aircraft. In satellites like Big Bird, we've had better systems than the Russians in terms of electronic ferreting, photography, infrared and ultraviolet and, in fact, the whole spectrum of intelligence work. We've maintained an extraordinarily detailed catalogue of the opposition's military and industrial strength—his ability to prepare for, wage, and sustain a war. Our satellites, and other systems, have let us in on a great deal about what the Russians do, have done, even plan to do. We know almost every airfield, missile site, power plant, and industrial center; they got it, we almost surely know about it. Which, of course, helps make detente real—you agree to agree, if you have to, if you know the other party is not only even up with you but probably has the edge.

"Ironically—for them—although our society is far more open than theirs, we've known more of their hard military and industrial capabilities than they've known of ours.

"The point, though"—and now he stressed his

words—"is that this situation can change." He looked at each person in the room. "Don't underestimate what I'm saying. The balance of reconnaissance capability is about to shift, and in *their* favor. It is not accidental."

"I follow you, Oscar," Steve said, "but I don't understand where the Apollo-Soyuz fits into this. If ever our two countries worked together on something—"

"We have other joint programs. We have a bunch of their nuclear physicists working in the Midwest; they're hosting American physicists in one of their top labs. We exchange in this fashion all the time, but all of it put together doesn't get one percent of the hoopla that we—and the Russians—are giving to this hand-holding session in orbit with the two spacecraft. We're geared for motormouth treatment of what we do. They're not, and yet they're doing everything but wearing Madison-Avenue gray and passing out cigars to everyone in sight."

Goldman now emphasized: "*Officially* there's no hope for a single American to go into space between the Apollo-Soyuz mission of July, 1975, and about 1980, when the first Shuttle is supposed to make its test flight in orbit. That's at least five years. Which tells you why the Russians haven't gotten any further than their Storm spacecraft—they've got a five-year grace period in which to do pretty much what they want. And in five years their big booster—that first-stage job with eleven-million-pounds thrust—will likely stop exploding on them and be ready to kick some two-hundred-ton payloads into orbit."

"And don't forget," Ted Anderson broke in, expression tight, "that the world doesn't know about Asp being capable to orbit. The Russians have some ideas but we've pretty well kept Asp bottled up in hypersonic flight programs. That's helped to get them to show their hand a little more clearly."

Rudy Wells gestured for attention. "I'm afraid you're over my head on that."

Anderson looked to Oscar Goldman, and the OSO man nodded for the colonel to pick it up. "Oscar said the Russians were beating us where our reconsats were concerned," Anderson continued, "which tells you what the Russians hope to do—stick fingers in our orbital eyes while we're cutting back.

"If they only have at our satellites with unmanned ships, well, we can do the same pretty well. But after Apollo-Soyuz? We won't have any manned spacecraft—and they'll be sending up the Storm ships in a crowd. They—"

"You're going too fast, colonel," Goldman said. "During the past several months our reconsats have been suffering from knockouts. The problem is not just serious—it's critical. Some of the satellites are found to be tumbling, and nothing we do brings them back under control. Others have stopped functioning, for reasons still unclear to us. Still others have just exploded. No"—Goldman shook his head suddenly—"they didn't just explode. They were *blown up*. The point is that at least eighty percent of our reconnaissance ability from space has been wiped out. All or most of the advantages in spaceborne surveillance has gone over to the Russians. *We're going blind*, we can't see, and intelligence is yelling, because there's every indication the Russians are building new missile complexes, they're moving to increase their first-strike capability over us without our knowing how and where.

"We've known for some time the Russians have been using advanced in-orbit maneuvering systems. They—"

Steve interrupted. "Oscar, we've got the same capability. Why don't we use it?"

"It's too late. Intelligence, and it's also common sense,

indicates they're going to lay off chewing up our satellites, but only temporarily—just in case we're foolish enough to make waves and jeopardize detente before the world. And they know that's unlikely—not only for the sake of detente but also because we don't want to publicize their effectiveness against our space surveillance. That's why we've never made an international complaint about what they were doing, and as a result it's too late to cry about it now or move against them—first time we do they'll be screaming from the top of the U.N. building about the U.S. murdering detente, jeopardizing the peace, and so forth.

"*That's* also why they've been pushing the publicity boat on the joint manned mission. If we rock that particular boat now the Russians will scream that our precipitate actions are forcing them to drop out of Apollo-Soyuz. If they do this before the rest of the world—and let me make it clear that worrying so much about world opinion is not *my* concept of how to function—it will be a severe blow to our space position on an international scale as well as here at home. We'll be made to look as if we deliberately broke up years of preparation. It will be the old talk about the military-industrial complex and warlords again. And this time it will be completely phony—pitifully so, if you look at the facts. In other words, the Russians have played their game shrewdly; we've been hurt. We can't complain about yesterday. They've got the advantage right now in reconsats. In the past seven months, instead of eighteen working military reconnaissance satellites, we've had only two." Goldman glanced at Colonel Anderson. "Ted, please pick it up where I stopped you before."

Anderson got to his feet, pacing slowly. "I was talking about manned spacecraft . . . that after Apollo-Soyuz we won't officially have any for five years. Or more, depending

upon how congressional and fiscal tempers run. You know what this means?" His pacing stopped and anger seemed to flare in his eyes. "*It means that we'll have played right into their hands*.

"The moment the Apollo-Soyuz program is over the Russians will start sending up *manned* ships to go after our reconnaissance satellites. *Manned* spacecraft, do you understand?" He slammed a fist into a palm. "And presumably we won't be able to do a thing about it because we've agreed in a pact with the Russians never to take any aggressive steps where *manned* spacecraft are involved. And—"

"And," Goldman finished for him, "they'll have five years in which to knock out our reconnaissance satellites unopposed. Every time they get near one of them, we'll be helpless, because if we use a robot ship with weapons to go after them, they'll be able to yell, and with justification, that we're using weapons on *men*. *That* violates our own space charter, if you want to call it that," he added, with a flare of undiplomatic frustration over politicians involving themselves in such affairs for temporary public-relations advantage, "and it goes against our bilateral treaty with the Russians, *and* with our resolutions in the U.N. Are you beginning to get an idea about what we're facing?"

There was a long silence. Dr. Rossi crossed the room and poured black coffee for herself. "Steve?" she said, and he nodded. She brought coffee for Steve and Rudy Wells as well as for herself. The physical movement helped.

Steve took a long swallow of the hot coffee and turned to Goldman. "All right, Oscar, we've all walked around the center of this meeting."

"Yes, we have," Goldman acknowledged. "The Asp. Using the publicity for Apollo-Soyuz, the Russians are going to approach our government for a joint space-station effort.

There'll be all the obligatory hoopla with it, but it will be a sham, a smoke screen. They know Congress won't appropriate funds for a station right now. Not with the oil problems we're having with the Arabs, not with recession and inflation. Our friends in Congress are having fits keeping funds moving for the Shuttle program as it is. There's no way they'll spring for the money to refit a Saturn V booster for a station. The whole program has to wait until the Shuttle is ready and then, somewhere about 1983 or 1984, if the economy permits, use the Shuttle to bring up a station in pieces and put it together in orbit. Dollar for dollar, that's the best way."

"And meanwhile," Rudy Wells said quietly, "they'll be clobbering our reconsats."

"Precisely."

"Let's get down to the Asp," Wells prodded.

"Officially," Ted Anderson broke in, "the Asp is strictly a suborbital research vehicle. Understand that. We've got friends in the Congress who realize the facts of life, but we've got to understand *their* problems, too."

"What are you trying to say, Ted?" Steve asked.

"That we've got to take the Asp program in slow stages," came the immediate answer. "Our friends on the Hill will work with us, they'll move supplemental appropriations around, but *we* have to *prove* everything we claim we're able to do. So we've worked out a program that calls for much more than just flying a manned interceptor with weapons capability into orbit. Our friends on the Hill want proof—*proof*—that the new spacecraft they back is for sure the winning combination." He looked at Page Rossi.

"Doctor," Anderson said, "I think it's over to you."

She turned to Steve. "We call it Project Symbot," she started.

CHAPTER 10

"*Symbot*?" The word echoed from him.

"For symbiotic," Page Rossi said. "And it involves a triad—the Asp, you, and"—she hesitated just a moment —"myself, as bioelectronics control."

"Doctor," he said pleasantly, "you have my full attention."

"We're going for the quantum jump in the performance of a manned spacecraft. The program is as much physiological—the human element—as it is concerned with flight hardware and engineering.

"There's no question that with new propulsion and other systems," she went on, "we can build better-performing spacecraft. But it's not enough. We can't get that far ahead of the competition to make the kind of difference that really counts. The whole purpose of my role in this effort, Steve, the primary goal, where I'm concerned, anyway, is to do away with the constricting time-lag involved in the process of what a man wants his ship to do, going through the decision

time, going through the motions of activating his controls, having the ship react, judging the extent of that reaction, and then providing counterforce to stop the reaction.

"We're talking about giving a *spacecraft* the kind of maneuvering ability a man gets with a fighter airplane. I think I'm aware of the differences in aerodynamics and orbital maneuvering, but I'm using the term 'fighter airplane' as a working example. Didn't the astronauts refer to the Gemini as the last of its breed, Steve?"

"Uh huh, Pete Conrad and Dick Gordon made a lot of that. They called the Gemini the last of the fighter-type spacecraft, the last of the 'fun machines'."

"Then it's that sort of thing I'm talking about," Page went on. "The experienced pilot, even under pressure, doesn't have to expend that much cerebral effort in specifically making decisions about what he's going to do. It's a, well, a gut feeling. He and his machine get to be one, a single entity, as though man and aircraft were embodied in a single soul. He—"

"Doctor, you've got some of the poet in you," Steve said.

She reddened slightly. "I suppose I do tend to get carried away . . ."

"No sweat," Steve said. "Now—back to this description of man and his iron bird and how the two get to be one. What you're saying is true. The first thing we teach new fighter pilots is that when they get into a scrap they've got to become a part of their airplane. You don't think horizon or up or down or what. You fly, and it doesn't matter if you're on your back or rolling or whatever. So I'll buy all that. But what I'm left hanging with is your attempt—and I do think it's wishful thinking, to be blunt about it—to bring about the same situation with a spacecraft."

"Are you saying it's impossible?"

"Right now, based on the energy yield of fuels, and all other things considered, if it isn't impossible it's awfully close to it."

"We're . . . keeping strictly professional?"

He studied her. "What else, doctor?"

"On that basis, then, *you're* impossible." She added hastily, "Physiologically speaking."

She saw him tense at the obvious reference to his bionics structure. "Look, Steve, I'm *not* being personal, but I saw your reaction when I spoke and—"

"Rudy said you were a passing-fair psychologist."

"I am, and I'm also a doctor and a bioelectronics specialist, which includes bionics systems. We're going to be working very closely, and I can't tiptoe around your sensitivities over your bionics systems."

He didn't answer at first, but looked at Rudy Wells, who suddenly seemed remarkably interested in the ceiling of the room. Of course, she was right. He nodded. "Your point, doc."

"Then"—she wasted no time in picking it up—"on the basis of medicine and physiological systems going back only a few years, you as a bionics entity are impossible. So, of course, were a lot of other things that today are commonplace."

"True, but please remember I referred to circumstances as they exist *now*."

"And I agree with you. That's why I'm talking equivalencies. . . . The Air Force has had this fighter-type capability in a spacecraft as a long-standing goal. It goes back decades, in fact, and I'm sure you're aware of this as much as anybody." She saw him nod.

"No matter how much we theorize, we need actual

orbital flight for verification, for acid checkout of our proposals. Asp is one way to get everything we've been looking for. In essence, what we've built is a spacecraft that's free of the cumbersome instrument systems and controls of what I'd call the standard space hardware—Apollo and Soyuz are good examples."

She took a deep breath and Steve had the impression that she was sidestepping a sensitive issue, holding it in abeyance.

"We started Project Symbot several years ago. It's sort of a stepchild without claiming parents—it's come under the funding of several Air Force divisions so we could get the money we needed without calling attention to the project as a separate entity."

Oscar Goldman broke in: "That even includes OSO funding."

The next few minutes were to shake up Steve Austin as almost never before.

"What the Air Force has been trying to do," Page Rossi went on, "was to create a real man-machine symbiosis. To link the body-and-mind capabilities of a man through a bionics-electronics system directly to the spacecraft. In such an arrangement the man would actually sense and feel within his body, through the signal inputs to his brain, just what his spacecraft was doing in terms of attitude, rolling motion, acceleration, external heat flow, radiative energy, fuel depletion, atmospheric reentry, and so forth. It would—by it I mean the man-machine symbiosis—also be able, through range-finding systems, to determine range, closure rates and other data as they involved other spacecraft. Everything I've described would be linked to the computer system of the spacecraft for velocity and other vector data."

"Page, I take it you're describing Project Symbot."

She met Steve's intense look. "Yes, I am."

He leaned back in his seat, but now she knew his full attention was on her; even across the table, the impact was almost physical. "Please don't stop now," he said quietly.

She didn't. "Such data are normally presented through instruments and other readout facilities, as in aircraft or spacecraft instrument panels. But if we're to get this quantum jump we've got to bypass instrument detection, presentation, pilot readout and evaluation, and *then* pilot reaction.

"The question that's been our goad all through these years is simply: Can a man be linked electronically to his vehicle so that he feels in his own body and in his brain the flight characteristics of his ship? For example, can acceleration be measured in such a way that the man not only detects the acceleration, as he does normally in terms of g-factors affecting him in gross physical sensation, but gets the information accurately, with fine discretion, including whether the acceleration is angular, linear, or a changing combination of all these? Can he detect roll movements about multiple axes in this manner? When reentry begins, can he get accurate increasing g-pressure, bow wave shock force, thermal yield, and, well, accompanying data?"

Steve stared at her. *She absolutely believed what she was saying!*

"If all this can be done," she went on, her enthusiasm rising, "*then the man becomes the ship*. He looks no further than himself—or visually beyond the spacecraft—to know everything it or he is doing, and to fly it as instinctively as he moves his own limbs and his body! It's the ultimate in hang-gliding, I suppose, except that the flight isn't a prisoner of gravity. The analogy with hang-gliding is specific in that there are no instruments or devices other than the man and his aircraft, if you can call it that."

She looked slowly about the room and then back to Steve. "To a considerable extent," she said carefully, "this system has already been tested and there is hope that we are on the edge of implementing the research in a practical fashion."

"Dr. Rossi."

She was afraid of that. Steve Austin had turned ice-cold.

"Dr. Rossi, you just gave me a long-winded jawbreaker about *implementing* the research in a *practical* fashion. Are you trying to say, or are you afraid to say, that you're about ready to commit to orbital flight with a man and a spacecraft linked in this symbiotic fashion? That you're ready to plug the man and the machine together? Right *now*?"

"Yes, sir," she said—the formality also caught him by surprise.

"Are you talking about *me*, Dr. Rossi?"

She stood up and looked from him to Rudy Wells. "I think," she said, "that the rest of this conversation should be held in my absence."

She left the room.

Rudy Wells attended to the coffee in the silence that followed.

"All right," Steve said finally, "let's have the rest of this on-going mystery. Ted," he said to the colonel, "you've been holding back on me. And as for our doctor friend here—"

"What about me?" Oscar Goldman asked. "Or am I beneath your wrath?"

"From you I expect anything—also nothing."

"You're right, of course," Wells said hurriedly. "We've been letting this out a bit at a time, but we thought it was necessary, Steve. Nobody figured you'd like the process, but

the alternative to your dislike, at least at this stage of the game, was likely to be outright hostility and perhaps even rejection of the idea. Small doses seem the best M.O."

"Then let's hear the *rest* of it. Now."

"Fair enough." Wells leaned forward on the table. "Of course, we've been psyching you, getting you to accept certain levels of information, certain skills and capabilities of various people."

"Page Rossi, as one example?"

"She's the most obvious—and important—one."

"Well, I'll tell you something then," Steve said. "The woman is better than smart. I've watched her work. She's tough. I'll accept everything you've tried to sell me about her. I've even got my own grudging respect for her—"

"I'm very glad to hear *that*," Wells said.

"But it's not enough," Steve said heatedly, his open hand smashing down against the table. There was a loud crack and a ripping sound as his bionics hand splintered wood. "I didn't," Steve sighed, "mean to—but I wanted to say that everything I've had from Page Rossi, no matter how impressive, can't compensate for a major *lack*. All her fancy talk about equivalencies between aircraft and spacecraft, everything she said about how to fly a fighter, and what to do with a spacecraft that had symbiotic capabilities between the crew and the machine . . . it would mean so much more, and I could believe more in her, if she knew, if she really knew what it was like inside a cockpit. And not with anyone else aboard, either. She'd have to be alone, just her and the iron bird, and—well, I can't make it over that particular barrier."

"You sound," Wells said seriously, "as if you'd like to."

"I would. She made a lot of sense in here—"

The telephone rang. Colonel Anderson picked it up,

listened for a while and said into it, "Very good, we'll be right there, thank you." He hung up and got to his feet. "Steve, Rudy and Oscar, I'd like you all to come with me. Want to show you something."

"More cat and mouse, Ted?"

"Why sure, boy. You know I never give up."

The four men left the office and climbed a stairway to the roof of the building, which overlooked the main runway. At the far end of the runway an F-4 fighter had just turned onto the active. The pilot was holding position as he ran up engine power. The dull boom of the afterburner coming in rolled like hollow thunder, and the cloud of smoke from leashed power boiled in a rising cloud behind the fighter. Then it was rolling, faster and faster, the big nose well down on the runway, the thunder rising and the scream of air piling into the intakes starting to reach painful levels. The nose gear came up as the pilot brought in back pressure on the stick and she was off the ground, the nose coming up steeply but the gear still down and locked. This pilot was very good, for the big Phantom was breaking through a nose-high roll, the afterburners lashing air with diamond-studded shock waves, the thunder howling at them now as the fighter swept past their viewing point, still completely rolling about and finally, as the nose came down through the roll, the pilot brought up the gear and cleaned up the airplane.

But the pilot wasn't through, for, as the nose came down, the afterburners still thundering, he held the Phantom in the plunge back toward the runway, keeping the drop until the last possible moment and then hauling up into a great, towering loop. The fighter hung on its back high above them, magically suspended, it seemed, until the pilot brought her down the backside, measuring the heady plunge so that it came out of the loop, the nose coming up swiftly now, just at the far end of the runway.

It flashed past them, and the nose came up as the Phantom went into and held a series of wicked rolls, the wings flashing around and around like whirling razor blades. The fighter snapped level from the rolls, held the wings-level position until the opposite end of the runway and horsed up into what Steve knew had to be a punishing pullup of at least six-g. Going straight up, the Phantom whirled like a dervish through a series of aileron rolls, climbing until it was more than 10,000 feet high, then easing into a gentle breakaway. It came back toward earth in a diving series of gentle rolls that took even more of a deft touch on the controls, Steve knew, than the violent upward corkscrewing motion of the climb.

They watched in silence, no words necessary, all of them recognizing skill at work in that cockpit. The big jet fighter came by them, right on the edge of supersonic, scant feet over the runway. The nose came up to get the bare clearance necessary, and suddenly the wings were vertical as the pilot snapped her from level flight, slamming—that was the word for it—into a vicious pitchout, the nose coming up through the sweeping turn, and then the garbage was coming out, the gear locking into place, and the Phantom seemed to be snagged by an invisible net in the sky as the pilot bled away the airspeed and brought her loafing in, touching down like silk on the end of the runway. Moments later the deceleration chute blossomed out.

"That," said Steve, "is an airplane driver."

The big Phantom taxied from the active, dropping the chute for the flight-line crew to retrieve, and then it rolled toward the building, riding gently on the nose shocks, the canopy coming up. A lineman signaled for the pilot to lock the brakes and shut her down. The engines died away in a singing, high-pitched whine, and a crewman hustled a ladder to the side of the airplane.

The pilot in the front seat took off his helmet, and Steve

stared in disbelief as Page Rossi nodded to them from the cockpit. He turned to Ted Anderson, who nearly managed a straight face.

"We figured that *telling* you what she could do, Steve, wouldn't be quite as effective as letting you *see* it."

Rudy Wells finished him off. "Page is more than an excellent pilot, Steve. She is also the first, fully-qualified woman astronaut in the Air Force."

CHAPTER 11

"I've never seen one of the big ones go," Page said. "It's ridiculous," she went on with a laugh, "but I'm excited as a kid. I mean, I've seen some of the Thors from Vandenberg and I was at the Cape once for a Centaur launch, but nothing as big as a Saturn and . . ." She looked across the seat to Steve. "I do run on, don't I?"

"That you do," he said, "but you don't hear me complaining. I'm even getting to like it." His words were warm.

She turned away to look through the jetliner window. The Gulf coast of Florida lay 37,000 feet beneath them, and far ahead and to her right she saw the western shore of the peninsula fading away in the afternoon haze. "We'll be starting down soon," she said, and leaned back in her seat. "And from Orlando it's only an hour's drive to the beach." She studied him. "It's different for you, isn't it? I mean, you've been here so many times before."

He nodded. "Well, we flew in here enough times, and we lived here for a while."

"And it's where you left for the moon. My God, I wonder how many people really stop to *think* about that, Steve. When I was a child all this, it was . . . well, it was a science-fiction dream. We were fascinated by it, my whole family was wrapped up in flying and medicine, and my brother was one of the early rocket engineers, but it wasn't something that was *real*. Do you understand what I mean? We were involved, but we were really playing with the dream. And then, all of a sudden . . . men were in orbit and we were driving to get to the moon and it *happened*. The world woke up one morning, or stayed up one night, and there they were, Armstrong and Aldrin, walking on the moon, kicking up dust, and it was so impossible to believe that they were a quarter of a million miles away and—" She shook her head, her hair flying softly about her face. "Do you know what I did when I watched Neil come down that ladder? When I saw that ghostly image, I knew somewhere in the back of my mind that I was watching an incredible moment in human history, a man about to take the first step onto another world. Know what I did? I cried. Matter of fact, believe it or not, I bawled."

"I believe it, believe it or not, and I liked hearing you say it."

"Good . . . and now, sir, it's only inevitable that I ask for your autograph."

"You know, Page, I was thinking about the way you tooled that F-4 around the other day, and I was thinking maybe I should ask for *your* autograph."

She held onto his arm, deciding not to speak any further. They shared a sudden, and unexpected, closeness. Steve let the silence rest easily between them until they were on the long downslope to Orlando. "I was thinking," he said, "that it's too bad you couldn't have seen the Saturn V fly."

"Well, this Apollo will do very nicely," she said in reference to the manned flight they would soon watch lift from the Kennedy Space Center, the U.S. Apollo half of the Apollo-Soyuz joint operation.

"But it's a much smaller bird—although impressive enough, in its fashion. Still, when you figure that all eight engines on the Saturn IB first stage are equal to just *one* of the five engines of that big V's first stage . . ." He shook his head. "That was a lot of machinery to fly. I never really believed we'd ever get that thing off the ground."

"I'll watch the IB and let you tell me about Big Mamoo, as I believe you call it."

"How'd you know that?"

"Rudy was telling me the private names you people had for your toys."

"Toys?"

"You know the old adage, Steve. The only difference between men and boys is the price of their toys."

"Female chauvinist."

"That's me," she said lightly, and became silent as they bounced while going through clouds on their way home. When they broke free of the white mist, the Florida flatlands stretched far ahead of them but they were still high enough for cars to be tiny dots on the threadlike webs of major highways.

"It's kind of sad when you think about it," she said, as much to herself as to Steve.

"Page, you really travel up and down your emotions. What's so sad?"

"I was just thinking . . . this being the last Saturn ever to go. It's hard to *accept* it."

"Better start," he said, "and besides, it's not so sad. This business is all climbing ladders. What you're saying

now is the same lament we heard when Gordon Cooper splashed down after Mercury Nine. Al Shepard was supposed to fly one more Mercury mission but NASA scrubbed the deal. They figured we'd learned all we could from tin-can spaceships and the money would be better spent on Gemini. So we flew ten of those with people aboard, and they shouted day and night when Gemini went by the boards. But it taught us what we needed to do to get Apollo into high gear."

"I realize all that," she said, "but I'll never understand eliminating those last four landings on the moon. Think of how much we could have learned from—"

"Hold it, you're forgetting something. Sure, four more landings would have been great. But somebody on top had to make a decision. The money pie was getting thin, Page. Do we go back to the moon with Apollo, or do we fly Skylab? In the long run, Skylab, coming as it did on top of what we learned from the lunar flights, was the better payoff."

She was surprised to hear that from the last man who had walked the moon. "Do you really believe that, Steve?"

He laughed. "I'm older and wiser now, Page. That's why no crocodile tears for this last Apollo for the Russian shot. Anything we can do with Apollo we can do a hundred times better with the Shuttle. I don't like the five-year delay any more than anyone else, but we *are* getting the big iron bird and—"

"Aren't you forgetting our conversation a few days ago? With Goldman?"

"I'm not forgetting anything. We're talking about two different things. To me it's remarkable that with all the talent we have for banging each other over the head that we're actually flying this mission with the Russians. Hey, it wasn't so long ago that this whole thing was nothing but fiction. A

friend of mine wrote about it—did you ever read the book, *Marooned*?"

"No, saw the picture, though."

"Well, you're about to see the movie come true with the Apollo-Soyuz flight. If this mission works out the way we hope, Page, we each have the demonstrated ability to help out the other guy if he gets into trouble."

Steve cinched his seatbelt tighter as they shook, going through turbulence. "There are some more amazing things between heaven and earth," he said.

"Such as?"

"Such as that in a thousand years I'd never have believed there could have been a real live female under all that Ironpants Gertie routine."

"And now you've found her?"

"Who knows?" he said.

The DC-8 rumbled through its structure as the gear came down and the pilot brought in power with a high keening from the engines. They rolled into a wide bank, and green countryside lay before them as they looked down.

He could sense the shift in her mood almost as quickly as he saw the changing expression, the seriousness, that came to her face. She apparently was trying to find the right words to something before she spoke.

"Steve . . ."

"Whatever it is, you're fighting it. Let's have it."

She nodded, looking directly at him. "Steve, the Asp . . . how long would it take you to be ready to fly that thing into orbit?"

He looked at her carefully. "I'm ready now. All the training we did at Edwards, well, we were really profiled for orbital configuration. We haven't been able to go the full

route, but we were never trying. All we need is a bigger kick to get the thing going. With the new fuel in the Asp''—he shrugged—''even the Titan 3X could handle it.''

''Can I try some 'if' questions?''

''Could I stop you?''

''I hope not. All right, then, supposing we *had* a booster, and supposing the Asp itself was configured, assuming all the hardware were ready, Steve, that sort of thing. If it was all—''

''Page, just *what* are you trying to say?''

Her hand rested on his. ''Please, bear with me.''

''You mean, if we had the green light now with the hardware, how long before I'd be ready?''

She nodded.

''Tomorrow morning. Soon enough for you? Because when I really think about going all the way back—'' He stirred himself, glanced outside as they rolled out of their last turn onto final approach to Orlando. ''Okay, we've been playing your game for a while, now *I* get some answers, right?''

She looked straight ahead, nodding.

''Then what's this all about, Page? What are you leading up to?''

''It's this trip, Steve. Our coming here to watch the Saturn launch.''

''Well, what about it? A few hundred thousand people are coming here to see that thing fly.''

''We're here for another reason. Our . . . our coming together is a cover. You're needed here at the Cape. There's no way you could show up without being recognized. If you came here as a colonel on active duty there'd be questions immediately. I mean, we'd have to be here whether or not this launch was taking place. But timing our arrival with the launch is, well, perfect for our cover story.''

He was exasperated and showed it. "What *is* our cover story? That we're sightseeing? Here as birdwatchers?"

"That. And . . . and something else."

The jetliner sank to the runway, a dull, shaking rumble as the lift fell away from the wings. The sudden roar of engine reversal nearly drowned out her words.

"We're going to be seen a lot together, so . . . so the story is that we're, you and I, we're engaged."

He nearly choked. "What *for*? Why all the charades, for God's sake!"

She'd lowered her voice as they rolled from the active to the taxiway, approaching the terminal.

"Steve, it's happening."

"What are—"

"You're going back. Into orbit." She hurried on now. "We've had an Asp here at the Cape for several months. No one knows about it. It's been in the VIB at the Titan complex. They've been making modifications here based on the test flights at Edwards. No one, as I said, knows a thing about it."

"You mean I'm going to fly that thing . . . on top of a 3X?"

"Yes."

"But . . . that's *great*. Incredible! Except why the secrecy all this time? I don't mean with the public, I mean with me, not letting me know before this, before right now."

"Because, Steve, I'm going with you."

CHAPTER 12

The flight of pelicans, a long, lazy formation of birds in single file, drifted within scant feet of the balcony, throwing blurred shadows across the picture window of the apartment on the edge of the Atlantic Ocean. Six stories above the ground, in an apartment borrowed from a friend so that there'd be no problems with the ever-curious press corps assigned to the Cape, Steve Austin was having a knockdown battle with the same three men he'd last seen in the conference room at Edwards Air Force Base in California. Dr. Rudy Wells, Colonel Ted Anderson, and the ever-irritating Oscar Goldman from OSO.

"You're all crazy, all three of you," Steve told them. "This is going to be the first time this ship is boosting into orbit."

"There's always got to be a first time, Steve boy," Anderson said. He was sprawled across the couch by the window, enjoying the parade of pelicans.

"Yes, but she's never made an orbital flight—"

"Nor had you, before you made your first one," Goldman said. "For that matter, how much lunar experience did you have before you went to the moon?"

"It's not the same."

"Who says so?" Rudy Wells was at him now. "As a flight surgeon I'm saying Page Rossi is fully qualified for this mission."

"And as the director of flight-test operations at our desert palace," Anderson said, "*I* say she's fully qualified as a pilot and as an astronaut. And just as important—you're not going to like this—of the two of you, she's more important. There's more than one veteran astronaut around, but she's unique in her qualifications for the mission."

"But why the rush?" Steve demanded. "She and I have never had time to train together. If we're going up in that then we've got to work together as a team, which takes time—"

"You've got it now, Steve," Anderson told him.

"And you'd better fill every minute of it," Goldman said. "Our schedule with Symbot has been jumped."

"Then why not tell me what's going on? The first I knew about this whole business was from Page. Suppose you people give me the rest."

"It's secret, as you doubtless suspected, but not complicated," Goldman replied. "The congressional group we're working with has now definitely agreed to lay on the funds we need to keep Asp flying and Project Symbot a working reality. But they've also leaned on us to prove out right *now* what we've been claiming for ourselves. So if you want the official word, or orders, it's that while you're here—ostensibly to observe the Apollo launch with Page Rossi—you'll also be checking out Asp systems and modifications inside the VIB. When you leave here the modifica-

tions will continue and the bird will be rolled out to the white room at the launch pad."

"And as soon as you finish here," Wells added, "it's back to Colorado for both of you for the bionics modifications. It's all been set up—"

"Hold it," Steve said. "The bionics program—why aren't you in charge of the modifications?"

"I'm still in charge of *you*. I run the bionics end, but Dr. Rossi is best qualified for the Asp program and she will do the actual work on setting up the integrated-lock circuits for you to achieve the symbiotic relationship with the spacecraft. She'll monitor the effort; she'll judge the effectiveness of the bioelectronics work. But whatever she does at Colorado, to confirm systems she needs orbital flight really to check you out physiologically and bionically—as well as the ship, of course, and the extent of the integration."

Ted Anderson added from the couch, "You already pretty much know the drill, Steve. While you're here at the Cape you have two jobs. One of them is to appear in public, you and Page Rossi. Stories will be sent out—little items in the *Today* paper, for starters. We'll get Bill Cummins to spread the word on his station—"

Goldman turned to Steve. "Don't underestimate the importance of the social routine. There's no way, as you realize, that you can show up here without drawing attention. This *is* a joint mission with press coverage. The Russians are going to have observers here—or their representatives, anyway. They will see you, and part of their job will be to figure out what you're doing here. If we can make them believe it's a combination of sightseeing and romance, we'll have covered your tracks pretty well."

Anderson picked it up again. "You'll spend most of your time here, in fact, working at the Titan complex. In the

VIB, of course. When you've completed your checkout procedure here—we're flying in the Asp crew from Edwards to work with you, by the way—then you're on your way back to Colorado. Questions?"

Steve didn't answer immediately. He ignored the three men and went to the balcony overlooking the ocean. For some minutes he let his mind go blank, watching the pelicans and seagulls wheeling about before and below him. He listened to the sounds of the birds against the background of the breaking surf. Far to his right a Boeing ARIA heaved itself into the air from Patrick Air Force Base, its muted thunder mixing with the breaking waves closer by. To his left he saw the towers of Cape Canaveral looming on the horizon. He brought himself back to the apartment as Anderson began to lay out details of the mission he'd heard of only in general terms from Page.

"We'd like to go straight for the polar orbital flight," Anderson said, "but we're not ready for that yet. We have the hardware, but we need an operational test under somewhat less demanding conditions first. With Colonel Rossi flying as systems monitor, you will fly a Titan-boosted Asp into orbit from right here at the Cape. You'll launch with the wings folded inside the ship. The entire affair will be covered with a clamshell breakaway shield—the same kind used for the Viking and other missions. The cover story is a highly classified military satellite, a nuclear-detection system . . . but, obviously, *unmanned*. No one will know, beyond the key people involved, what's beneath the shroud on the top of the Titan 3X. No indication of a manned flight—but we'll run heavy on communications and telemetry, ostensibly for the purposes of interrogating the satellite systems that we're presumably flying."

Anderson took a deep breath. "There will be no indica-

tion of rescue teams deployed for the mission''—he noted a raised eyebrow from Steve—''but we will, of course, have ARIA aircraft along the orbital injection route, and the Navy will be moving both surface vessels and submarines into the necessary below-flight corridors, but even they won't know what's involved—at least not in terms of a manned flight. If there's an abort, rescue will be accomplished by the rescue forces already deployed. Jumpers from C-130 and 141 aircraft, subs in position, if possible. You know the whole route, Steve.''

''If we have any altitude at all we can get the wings out and we can fly.''

''Agreed,'' Anderson said, ''but officially I have to tell you that because of the lesser rescue coverage in this mission, you're fully justified if you decide not to—''

''Shut up, Ted, and get on with it.''

''I think I'll let Oscar give you the rest of it.''

''Why you, Oscar? This isn't an OSO job.''

''You're wrong, Steve. We haven't given you up. You're on loan, remember? Anyway, OSO *is* in this. Besides, there's more to this mission than the flight itself—important as it obviously is . . . You'll inject into orbit on a twenty-eight-degree inclination.''

Surprise was already showing on Steve's face.

''That's right,'' Goldman went on. ''We want a full exercise of plane change, and then you'll work your way to and you'll rendezvous with Skylab.''

Steve didn't believe what he was hearing. Rendezvous with that great abandoned hulk of a space station? They didn't have to prove their ability to make plane-change maneuvers. They'd done that so many times with Gemini and Apollo that—he shook his head and nodded for Goldman to continue.

"The station is at approximately 236 miles altitude and holding stable position." Goldman hesitated, then came in with the rest of it. "You're going inside that thing and—"

"I'm *what*?"

"You and Dr. Rossi will enter the Skylab—"

"You're crazy, no one knows what shape it's in by now!"

"It's stabilized," Anderson reminded him.

"It isn't enough to be just stabilized," Steve told him, his tone suggesting that he had been out there and knew first-hand what the problems were.

"Steve, this mission is go," Goldman broke in, "including Skylab and entry into the station. You two will go into the Skylab—you'll work out with the mission controllers a tethered docking or whatever. But you'll enter the station and you'll take motion-picture film. *Dramatic* film to impress gentlemen we need to impress back home. This trip isn't for science. You'll also bring back some special equipment in the station that was left there for just this purpose."

The question was all over Steve's face.

"One of the last teams to be up there in Skylab," Goldman explained, "left some equipment there under Air Force orders. A long time ago we figured we might be faced with just the sort of situation in which we find ourselves now, and we started taking first steps then. It was all done with the full knowledge of NASA. They don't like going five years without manned capability any more than do we."

Steve found no satisfaction in these years-long machinations of the Air Force, NASA, and OSO. His mind was on the problems he knew they might find in that derelict space station. Sure, NASA had maintained thruster stabilization, and they still used the instruments and some cameras for research and control test work, since the station was still

drawing in power from the great array of solar cells. But you couldn't predict what might have happened—meteoroid strikes, deterioration of equipment, poisonous gases, impairment of the venting . . . And if all went well, it was back to the meat block for him, to the necessary modifications to his own systems for a polar orbit—again with Page Rossi. She was everywhere in his life now, and she apparently would be for some time to come. . . .

"We've got to have your full cooperation from right now," Goldman was saying, "because the Skylab intercept mission is primarily to buy the ticket for the big ride in polar orbit. Whoever flies that spacecraft will be linked to it as one mind, one body. And Page Rossi, no matter what you or anybody else thinks or says, is the only person in this country equipped to handle the job. We don't have time to bring other people up to her level. She goes along as monitor and—"

"Monitor? Why don't you say babysitter? Look, I'm flying that thing. What if I don't want her along?"

"Then, colonel, you're grounded."

CHAPTER 13

It wasn't exactly *all* bad. When she wasn't being a doctor, or a lieutenant-colonel, or a scientist, or even an astronaut, Page could be remarkably charming and feminine . . . in an evening gown for dinner . . . in a bikini on the flat sands of Cocoa Beach. She was lovely to look at, witty, had men stumbling over their feet at the sight of her. She and Steve made sure to be seen at the best-known places along the Platinum Coast—which in Cocoa Beach meant Ramon's, the Surf, the Mousetrap. They had spaghetti-and-wine dinners at Alma's, and across the street Pedro whipped up wonderful Spanish dinners. They drove to the Ocean Grill in Vero Beach, flew with friends to Bern's Steakhouse in Tampa. They did it up very well indeed.

And when they went to work on the Asp, concealed within the cavernous reaches of the Vertical Integration Building within the security-guarded Titan launch complex, Page Rossi appeared to throw some kind of internal switch, converting her to cold, unreachable, efficient—and abrasive

to Steve Austin, who, through the years, had developed the knack of working hard without seeming to, of knowledgeably and professionally blending with his mission.

But not Page Rossi. She trusted nothing. Every last meticulous detail had to be rooted out for her inspection and criticism. More than once he was on that thin edge of losing his temper and walking away from the whole thing.

But he didn't. The siren call—it really was that for him—of space was much too seductive and persistent. Not to mention the promise of the man-machine symbiosis that increasingly fascinated him. He spent hours thinking about it, of becoming a new living entity—a *gestalt* of mind, body, and gleaming spacecraft.

When they drove from the complex through the security gates onto the main road going south through the Cape, when they went through the final gate on the long road looping around Port Canaveral, the switch would be thrown again. Page refused to take her work—or his—out of the shop.

Not even when they met other astronauts via Mary Bubb, veteran not only of the old hectic days at the Cape but also of a war decades before, who had the "in" line to parties with astronauts, selected press and friends. Page attended these social events strictly as Steve's fiancée. Nobody had so much as a hint that this gay and charming lady on Steve's arm was also the first fully-qualified female astronaut in the country.

Come to think of it, she was also quite a professional —and in more ways than one.

Steve came to live with the dichotomy, as well as with his own mixed feelings toward her, including increased respect for her professional capabilities, and almost before he knew it they were up to the morning of the Apollo launch.

Steve badly wanted to be at crew quarters at the Kennedy

Space Center with Stafford, Slayton and Brand, but the last thing he could do was to bring Page Rossi with him, and the Air Force (with OSO prodding in the background) insisted on continued public exposure of "the couple." So it was to the press site on Complex 39, just south of the huge monolith of the Vehicle Assembly Building, that Steve and Page joined the press mob come to attend birth and funeral—a magnificent launch and the death knell of the great Saturn rockets.

It didn't quite go according to schedule. Saturn IB liftoff had been set for 12:32 PM, when a hitch developed in the count. A pressure regulator gave readings that stopped the count where it stood, and engineers were back to the old ball game of trying to determine whether the readings were correct and the rocket was in trouble, or the instruments themselves were off and the rocket was ready and perfect to lift.

Meanwhile, the Russians had boosted their Soyuz into a neat orbit. They had had some problems in getting the precise orbital parameters they wanted, but they were correcting nicely and the computers showed that the Russian ship would be in position for Apollo to catch up in the orbital cat-and-mouse rendezvous game.

NASA decided to hold the count as long as possible and go for launch any time within the next window that opened at six-thirty that night. The gamble paid off. After hours of waiting, sleeping, playing cards, rattling off endless pages of copy, the press corps came alive when the count was picked up at T minus 52 minutes—and they all cheered the still magic words: ". . . *and counting*."

"You're in luck," Steve told Page. "What started out to be just another launch is going to be a night shot. Ever see the sun come up in the middle of the night?"

She hung onto his arm and looked at him with adoring eyes. He knew she'd spotted some cameramen getting candid shots of the last man to walk on the moon—with what could very well be his first wife.

"Page, I'm serious," he told her.

"I know. Just doing my job. Steve, couldn't we walk down there, to the edge of the turning basin? Away from all these cameras?"

He glanced about him, nodding. "Best idea you've had today."

They walked away from the bleachers, joining people in the gathering darkness by the water's edge, where barges had for years drifted in slowly with the great Saturn stages. Now no one was in front of them, and they were lost in the group of people on both sides and behind them. Steve handed Page his binoculars. Fifteen thousand feet away the Saturn IB was still bigger than life, starkly white with batteries of searchlights playing on the glistening ice coats surrounding the cryogenic tanks. The Saturn IB stood on a massive pedestal, far above the platform of the launch stand, the cryogenic tanks of supercold liquid oxygen and liquid hydrogen venting long plumes of swirling vapor before the wind. In the searchlight-studded twilight they heard the steady flow of announcements intoning vanishing minutes and seconds.

The last moments fled as the day slid into final twilight. High above them, very high, it was still bright. On the ground, with the vanished sun behind their backs, it was now dark.

The chant went down to the wire this time, and Page found herself gripped with excitement and fear, her fingers digging into Steve's arm. He held her close to him as the countdown clock ran out and a sun came into being beneath the great booster.

For long, impossible seconds the launching platform was a blinding cataract of flame. The great rocket stood chained to metal, unmoving, but they could almost feel the monster straining to break free. Finally the holddown arms snapped away and a glorious burst of golden-orange fire appeared as the Saturn began to heave itself upward. Now it was impossible to see anything but light—pure gold light pouring backward in a jagged, thick plume. By now the rocket itself was invisible, lost in the eye-stabbing explosion of naked light. In every direction outward from the ascending sun, night was banished, and Page was startled to see thousands of birds fluttering into the air, alarmed by the unexpected, violent intrusion of daylight.

It struck her that she had heard the fluttering of nearby wings. Something was wrong; then as she realized the truth, that it took fifteen seconds for sound to travel from its start at the launch pad to reach where she and Steve stood, the ascending giant hurled forth *its* sound with body-punching fury.

Not merely a roar . . . too much sound from one and a half-million pounds of thrust climbing slowly into the night-fleeing heavens for that. The shock waves tumbled over and through and mixed with one another so that instead of a roar they received a battering of sound, a whip cracking its broken thunder, which hit their bodies with startling physical impact.

Then, coming from higher and higher, gaining its own echo, it became a great machete of sound, sundering the sky. They were witness to a climbing volcano erupting shock waves, and the world vibrated in resonance. As the rocket went higher the shock waves eased off some, trailing the hammer of shocks and the howl of a giant running from itself.

The rocket threw night aside, set aflame thin clouds it

raced through, shock waves now visible to them, with yellow deepened into orange and becoming red. They saw the contrail begin as the Saturn punched through max-q, the region of maximum aerodynamic pressure, and the flame itself was blossoming outward in all directions like a rose bleeding flame in flowering glory.

And then, far above them, was a sight never before seen with a Saturn as the giant booster reached the line of shadow in space cast by the rounded bulk of the planet. That high above them it was daylight, and the Saturn went howling from night into the last vestiges of day far above the earth. Abruptly now the rocket and its still expanding fire trail were struck by the sun. The flame went through another color transformation, into a blood-red, and back into a distinct orange, but along its edges there appeared a rim of violet fire, the plasma of flame hurtling away in the nearing vacuum.

It became more fantastic with every passing moment.

Saturn exhausted the fuel in her first stage. In near vacuum the eight blazing engines shut down. There came a moment without the cataract of flame, but they could still see the deep red glow of the chambers. A ring of white flashed into being between the two rocket stages, the explosive bolts firing to sever the now-exhausted first stage.

Suddenly the upper-stage rocket exploded into life.

In the silence of space a glistening halo appeared around the burning S-IVB stage and its single engine. Ionized gases from the accelerating rocket rushed about in all directions, spreading the halo at tremendous speed. Normally it would have been invisible to the eye, but at this moment, this special moment separating night from day, it absorbed the full illumination of the sun while Steve and Page and all the others watching remained in darkness.

The halo spread wider and wider now, a pulsating globe

that became pale green in color and then began to reveal glittering spots of pink and deep purple. A giant teardrop, it expanded swiftly until it was more than a hundred miles wide.

And there were men riding that thing.

In the midst of the gases glowing in space, deepening steadily in greenish hue, lights appeared and began to move. The upper stage of Saturn burned fiercely, but through the plasma teardrop the color was not the familiar red or yellow or orange; it had become a whitish green with pulsating sapphire points. As it rushed higher and faster by the second, it produced its own bulging gaseous shape, a growing circle within the much vaster plasma teardrop.

Soon they watched the light coming back to them in the form of whorls and eddies, glittering spirals, one after the other, a plasma whirlpool in the heavens far above the upper edges of atmosphere. And the S-IVB engine continued to blaze, pushing the rocket higher and higher.

Then, to the right and below this light, there appeared a single blazing jewel—a hard, whitish-green light *not* from the Saturn. It was the planet Venus, gleaming through the swirling kaleidoscope of green.

Another light appeared, higher than the rest, it seemed to them. An optical illusion—the empty first stage of the Saturn, tumbling end-over-end from space, dropping back into the atmosphere. Friction tore at the metal skin, which glowed, then began to burn; the twisting, tumbling fall of the flaming rocket added an orange-purple sheen to the dazzling display in the heavens. To the naked eye the sight seemed to command most of the sky. The teardrop had stretched wider and longer, until now it had become an enormous white balloon of wispy substance tinged with the green hue of the swirling eddies.

Steve looked at the sky through his binoculars. Without a

word he handed them to Page, and when she brought them to her eyes he was not surprised to hear her gasp in astonishment. Through the binoculars the colors exploded into new prominence. The pulsating rocket engine kept the strange whirlpool of space spinning, flinging its glittering ribbons in all directions until Page was seeing through several layers of whorls, all moving, all clashing and passing into and through one another.

The tumbling first stage *appeared* to be higher than the still-burning upper stage as well as Venus, because of the earth's curvature. The S-IVB stage with the Apollo was bending far over in its flight to follow the arc of the planet. But the empty first stage had soared up and over, and was now coming down, much closer to the observers on the ground. And so it *seemed* to be higher—just as a person looking at a low-horizon moon from beneath a tree may "see" the moon as "beneath" the tree's branches.

Slowly, the celestial display wore itself out to a ghostly wisp of the awesome sight that had so entranced them. Finally only the gleam of Venus remained to pierce the dissipating teardrop in the heavens.

Page handed Steve the binoculars. She started to speak, then shook her head slowly.

He didn't try to talk to her. It was uniquely their moment.

CHAPTER 14

How do you feel, how does any man feel, returning to where he was reborn? Not born, but *reborn*. Or created. Re-created?

Whatever, they had a homey name for it—the Shop. Some tasteless wag tried to add on so it came out the Body Shop.

The Shop. The remarkable bionics research laboratory within which Dr. Michael Killian and Dr. Rudy Wells had wrought medical and bionics miracles. The lab rested deep within an inhospitable mountain well-known for its high, sheer face and jagged outcroppings. Spreading out before the bionics lab to the east of the Rockies lay a richness of land soothing to any troubled or weary mind. It was a perfect site for the lab, imbedded deep within black granite.

Close by, to the south along the rampart of mountains, lay the town of Colorado Springs, overshadowed by the huge bulk of Pike's Peak. Near the town was Peterson Airfield, which served as an airport not only for Colorado Springs but also for the Shop and the Air Force Academy. Also in the

area was the sprawling ground of Fort Carson, an Army camp that had been active for years, served by its own airport, Butts Army Field. And, not nearly so visible, nestled deep within Cheyenne Mountain and almost neighboring the bionics laboratory, was NORAD, headquarters for the North American Air Defense Command, with its great tunnels and caves gouged from the deeper bowels of Cheyenne Mountain.

The Shop was the bionics lab where Steve Austin had been recreated, reborn. NORAD was the electronic nerve center for space-tracking, detection, and surveillance systems throughout the world. It would function as the heart of flight control for Steve Austin and Page Rossi when they boosted into orbit within the Asp—it didn't matter to NORAD whether the orbit crossed the equator from the Cape or was dead-on polar from Vandenberg.

In the Shop, Dr. Rossi, for all her impersonal, self-confident, all-business aura, felt very much a tyro among pros. Rudy Wells had brought a shattered, limb-severed tragedy of a living creature named Steve Austin into this laboratory. The result of his work, and of Dr. Killian's, and of their staff, was a bionics miracle. They had worked down to the size-level of individual body cells, of individual messages flashed electrically from one cell to another. In the biological sense Wells and Killian had performed on a scale akin to the submicrominiaturization of the most advanced electronics and cybernetics systems (whence the name "Cyborg" for Steve) except that what they managed with Steve Austin was *alive*.

Page was in awe of their pioneering work, and of their success in applying the theoretical to a life basis. They had come to understand the nerve patterns of the human brain to such exquisite degree that they could create artificial nerve patterns that matched perfectly what had been created by nature. Dr. Killian's utilization of cybernetics was such that

first he learned the basic elements of machinery—human or artificial didn't matter to him—that permitted thinking. Once he felt he understood this miracle, and he didn't much care who agreed with him or not, he began to work with, to shape, and to create his own systems involving the nerve circuits of the human brain and the body within which it was fed, housed, nourished and transported.

Killian's search, with Rudy Wells by his side, was an incredible adventure. It was a search through a maze with billions of possible avenues, and they needed to find not simply the right avenue but an entire vast complex of pathways, all of them switching back and forth with the speed—literally—of thought. Then they had to learn how to anticipate this marvelous complexity, to judge how it would function at any given time in the future, and, finally, to teach themselves to incorporate artificial systems into what nature had taken so many hundreds of millions of years to develop (with no freedom from nature's own imperfections, it should be added).

Now Dr. Page Rossi had once again to delve into the bionics limbs and artificial systems of Steve Austin. She also faced a terrifying confusion. A bionics limb was, in the pure sense, an artificial contrivance, produced from inorganic materials. It was a device patterned after a living original. But no matter how well it might be made, or to what exquisite and intricate lengths its makers went, it was still an artificial device—*until* it became linked with the human body. In this instance, until it became integrated with Steve Austin, until it blended with the same electrical signals that flowed from Steve's brain through his own nervous network of message lines, centers, switching stations, trunks.

Once the bionics limb had been fused to Steve Austin, it did more than function as an outside member of his body.

It was a living entity, integrated with the life of the man himself.

Page Rossi needed to take care not to differentiate between what had been built and then attached to and integrated with Steve, as against what had grown as a natural part of his body. Of course, there were differences. If she needed to reach a foot nerve for a biosensor, she had no concern about inflicting pain because the biocensor wasn't an element incorporated into the bionics entity of Steve; skin could be cut so long as it was plastiskin and there would be no bleeding, pain, or delay in healing. At the same time, though, she needed to work with great care and to keep in mind that the *man* functioned with that bionics limb without special thought to its qualities. To foul the signal-transmission capability of the foot was to interfere with Steve's total ability to function.

She also had to work closely with Rudy Wells, for much of what she did involved the natural tissues and nerves of Steve's body. Not herself a surgeon of special ability, she needed to convey her knowledge to Wells in such a way that his very skilled hands could perform for her.

Through all this, Steve went through the familiar agonies of being poked and prodded, cut and spliced—and of numerous tests and modifications. If not for his own sense of dedication, his trust in Rudy Wells, and especially his growing fascination with the concept of symbiosis with the spacecraft, it was doubtful that he would have submitted to hour after hour of what he considered experimentation.

Page's key role was to establish an entire, additional system of biosensing capability in Steve. His own senses permitted him to judge heat, cold, acceleration (linear or turning), pressure and other forces and conditions acting upon his body. Sensing in this configuration—what Dr. Rossi called the "gross human mode"—was no more than animal-primitive; there was no way to establish parameters and there wasn't a hope for discrete evaluation of forces

involved. A man's system does many marvelous things, and the most marvelous of all is that it does so many of them at the same time, all packaged into the best computer system (his brain) ever devised. But nature had little need or reason to establish time coordinates or space vectors or delta-V sensing, and certainly nature's biological clock was never intended to be measured down to hundredths of seconds.

A spacecraft, though, through its built-in sensors could report and judge forces and sensations that either overwhelmed the "gross human mode" or were simply never received by human systems. For example, a man can feel heat—the action of his thermal sense—but he can't see in the infrared range. If he has instruments available to him that function in the infrared, they do this job for him and present a readout from which he obtains the information he wants. Still, it's a slow and sometimes laborious process, requiring a series of clumsy, in-between steps. It's also time-consuming, and in the world of vacuum conditions, riding centrifugal spiderwebs of orbital force, it could be so time-consuming as to be fatal.

Page Rossi implanted infrared meters along the bottom of Steve's bionics legs. *Not* sensors but infrared sensing-and-readout systems were emplaced throughout the Asp spacecraft. The information from this system was fed into a single-point focus. When Steve sat in the forward seat of the Asp and placed his feet on the rudder pedals, he did more than prepare to fly the craft.

First, the rudder pedals functioned to move the rudder, to control movement of the Asp in yaw and to coordinate turns in the atmospheric regions. But in vacuum, in space, the pedals assumed additional roles, and one of these was infrared—or heat—sensing. Centered in each rudder pedal was a twist-lock umbilical. When Steve eased into his seat, he pressed down with his feet against the umbilical connec-

tion. The umbilical moved into a detent in the bottom of his boots, and this in turn pressed home a connection that reached *within* his feet.

He made a thirty-degree twist to the right to "lock" the umbilical in place. Doing the same to the left released the umbilical lock. There was also an emergency override he could control on the spacecraft panel, and Page in the back seat surrounded by her console also had "lock" and "unlock" controls, as well as a master "emergency disconnect" for all umbilicals leading into Steve's body.

This one aspect of symbiosis with the Asp gave Steve the *human* ability to sense everything the detectors of the spacecraft picked up in terms of thermal readings. The instruments placed throughout the spacecraft picked up a heat indication and flashed the news to instruments on the panel. With the modified Asp, the same information fed to the umbilical connectors in Steve's feet, which flashed a thermal signal to his brain, much the same as skin (or his sensitized plastiskin) detected the thermal energy from a candle held close to the skin's surface.

Normally this would only have meant that Steve, through this system, received a gross input of thermal indication. But Page's symbot program went much farther than that. In his training at the Colorado laboratories, Steve would be subjected to varying thermal (infrared) radiations. What he felt through the sensors in his feet was also displayed before him on a readout instrument panel. There was still another panel based on biofeedback systems—which showed Steve visually, in alpha-and-beta-wave patterns on an electronic screen, precisely the infrared levels he sensed through the devices implanted in his feet.

With practice he became adept at matching the sensor input with receipt of the information by his brain. Because he was able to see directly before him the levels he was feeling,

it was only a matter of time before thermal input discretion became a matter of discipline and skill.

There were definite purposes thermal readings could be put to for direct sensing by the pilot-machine. Thermal indications showed heat buildup of direct solar radiation on any part of the spacecraft. It could also be used as a performance indicator during reentry; an entire reentry could be flown by the thermal pattern alone. The detonation of weapons in space had a thermal signature that could call for instant reaction by the man-spacecraft system.

And thermal sensitivity was only one aspect of what was being built into Steve which, when he was umbilically connected to the Asp, created a true man-machine entity—a gestalt in which Steve thought as the spacecraft would think, if it had the capability to do so.

Which it did when Steve became a living part of the spacecraft.

There was a way to check out most systems. Spacecraft simulators, configured exactly as the actual machine, were linked to computers that provided cues and inputs (including acceleration but not weightlessness) matching precisely those of an actual flight. And Steve lived in one of these simulators for several hours of every day, slowly adapting to thinking like the great, scimitar-winged shape he would soon take into orbit.

For their part Page Rossi and Rudy Wells came to live in a world of submicrominiaturization, for they were working on the level of nerve systems of the human body. Into Steve's inner ears went perhaps the most delicate sensors of all; attachments running from his body balance system—the otoliths and semicircular canals of his auditory and balance mechanism—as these were linked to the attitude-sensing systems of the Asp. When the spacecraft rolled thirty degrees to the right, for example, it was Steve who was doing the

rolling. That was the critical message he had to come to *believe*. It wasn't the ship rolling—it was Steve Austin.

Sensors were also implanted just below the skin of his buttocks to detect acceleration and changes of acceleration forces.

How high was he at any time from the earth's surface? Radar altimeters and laser beams provided this information to the spacecraft, which in turn instantly fed the information to Steve's biofeed systems so that he knew, as swiftly as instruments provided the information, what those instruments detected.

The single biggest problem was attitude control at any time during the mission. Could Page work out a system that would allow Steve to function as a mechanical device would, an automatic pilot, as it were, using an artificial horizon?

Ironically, it was Steve's earlier disaster in the lifting-body crash that provided the solution. If Steve was not looking at the 8-Ball before him, how could he possibly judge his attitude reference to the earth's horizon? There was no way sensors could be placed within the terribly intricate—and jellylike—apparatus that was the human eye. He *must* have an instrument reference of some kind.

But Steve Austin had only one eye. He'd been fitted with a range-finding system in the artificial eye; this had been the replacement for the camera device he had used on earlier OSO missions. Now submicrominiaturization came to the rescue.

The bionics lab had spent months of painstaking work—much of it under microscopes—building a miniaturized version of the gyroscopic horizon designed for the Asp . . . miniaturized enough to fit into the size of a human eyeball, and to be inserted during hours of exacting surgery into the socket of Steve's face. When the surgery was done, Steve had as an eye a complete 8-Ball reference system

that functioned on the basis of tiny gyroscopes and received its input from the larger system of the spacecraft.

It wasn't enough that he had this system implanted into or within the socket with freedom of movement through 360 degrees. He still had to be able to "see," and the artificial eye had never given him this capability. But it was possible, through a "living bridge" of bionics nerves, to crossfeed his own vision so that the information obtained through the 8-Ball in his socket could be seen directly, using reference grids and lines, by his *normal* eye.

So in effect the tiny instrument in his eye socket *was* a complete artificial-horizon reference. Rossi and Wells decided not to extend the capabilities of the new system further than the initial installation until Steve had enough time to become accustomed to this aberration of vision. After the first test flight he would be outfitted with special prisms so that when he looked in front of him he would be able to "see" the readings of the gyro horizon as a "glowing shape" in midair.

There was another critical decision to be made—this time with Steve's knowledge and agreement.

"We're not ready, we'd need another four months to get ready, for all your systems to be fully effective," Page told Steve in a final conference before their departure for Cape Canaveral and the waiting booster and Asp. "I'm afraid we could overload your systems. No matter what the simulator readings are there's no way to anticipate how shock, pogo effect, acceleration, zero-g, all of it mixed in together, would affect you. So I propose we build to no more than one-third full capacity."

"You mean the artificial systems—this symbiosis—will work at only one-third capacity?"

"Yes."

"Seems like you're hedging your own bets," Steve said.

"There's another reason. On this mission to the Skylab, we're going EVA, which means a complete disconnect from the Asp. It could be more of a shock than any of us realize. Including you. Like, well, being separated from the womb."

Steve stared at her. "You can't be serious."

"But I am. We don't *know*, Steve, and finding out we underestimated the symbiosis exchange with you and the spacecraft—while we're still in orbit—could be disastrous. Will you go along with me on the lower intensity of systems? After all, this is essentially a test and—"

He gestured to cut her off. "I'll buy it," he said after a pause. "After all, in more ways than I'd thought, this one really *is* your baby."

CHAPTER 15

They spent ten days at the Cape getting ready for the mission. There was enough to keep them busy twenty-four hours every day, and Steve had to fight against his habit of personally checking out the spacecraft systems. Instead, Ron Kevin, the command-module pilot of the Apollo XVII mission, who had returned to active duty with the Air Force, functioned as his alter ego for this assignment. Knowing Kevin as he did enabled Steve to relax and concentrate on being completely at ease with the Asp systems.

For the first week Rudy Wells ordered midday breaks for both Steve and Page. "It isn't necessary," he told Page, "for you to be on the same sort of pre-mission scheduling we've had in earlier flights. You're not going along as a pilot. It's enough you're checked out in the ship so that if anything should happen to Steve you can get the ship back down in one piece."

"But there's so much to do in these few days," she protested. "I've simply got to—"

"You've got to follow my orders. I mean that, Page. I'm a better judge about this than you are. You and Steve have been walking a tightrope schedule for months. If you don't relax—and make certain *he* relaxes—I'll have to delay the flight because of an uptight astronaut. I don't mean dinner and nightclubs. Get him out on the beach during the day, go to New Smyrna; it's only a few miles north of here and it's just about deserted. Make sure the two of you go out alone, without any work, every day. Your last seventy-two hours will be enough to make you *want* to relax."

Colonel Ted Anderson rode shotgun on the project, leaving nothing to chance. They didn't need to bring in any special crews for the launch vehicle. The Titan 3X team knew their hardware to perfection, with seven straight successes out of seven shots with the powerful booster.

The public-information office of the Air Force Eastern Test Range at Patrick Air Force Base, eighteen miles to the south of the Cape, did a masterful wool-pulling job with the press. Hughes Electronics worked tightly with the Air Force and even prepared a mockup satellite that supposedly was a duplicate of the intricate and oversized equipment atop the Titan 3X booster. There would be no hiding the launch, of course, so rather than throw a cloak over the whole affair with a flat refusal of information on the grounds of security, the project team went all-out with their red herring. With so much copy being distributed on the military-systems satellite, no one even thought to go further and suspect a manned vehicle. Pad security was absolute, and only a handful of men working within the Titan complex had even seen the Asp. When it had been moved from the VIB to the launch pad it was covered with the great shroud, and this stayed on until the bird was encased in the gantry white room for final servicing.

The ten days moved in a flicker of hard work and enforced time away from the Cape. As Wells had assured Page, the final three days were almost a blur as she prepared herself for the flight and monitored the systems within the spacecraft.

They were ready to go five hours before scheduled launch. First she had watched Steve suited up—she had to make a final check of all the symbot connections and devices within the suit. When Steve was ready she went through her own preparatory routine. The suit technicians never did quite get over their slight daze at preparing a beautiful woman for a launch into orbit—and not being able to tell a single soul outside their own group what they were doing.

Prepared for spacecraft insertion, Steve and Page rode from the VIB to the launch pad itself in a truck marked DANGER—EXPLOSIVES! A precaution perhaps unnecessary for security, but still one followed with meticulous detail. A Titan 3X launch involved the use of dangerous acids and chemicals in addition to the rocket boosters, and tight precautions were an everyday fact of life. In a purposeful show of openness, Ted Anderson ordered the press site of the Titan complex opened to newsmen, and more than a hundred members of the fourth estate were on hand, drilling out to the world their copy about another military satellite, and remaining all unaware of the excellent if unintentional job they were doing to cover up actual events.

In the details of the final hours, nothing was left for Page herself to do except check out her control console, once Steve was hooked into the Asp systems. Only three men were permitted to remain in the white room when she went through the symbot preparations; Anderson wasn't letting loose a single fold of the security cloak in *that* area.

And then it was done. Anderson and Wells said their last

face-to-face good-bys with the man and woman in the spacecraft. The plexiglas hatch was closed, locked and sealed, and the covering clamshell shroud moved into place. When that was done, Anderson used the plug-in communicator to the Asp cockpit. "We're all set here."

"Then kindly get out of here and get this show onto the road," Steve told him.

"We'll do that. I'll personally kick the tires for you on the way down."

"Do that."

"Page, you hear me?"

"Five by, Ted."

"Y'all behave yourselves when you get up there in that station, hear?"

"Right. No more than three beers. Promise."

"Godspeed," Anderson said, and pulled the connections loose.

Thirty minutes later the gantry tower started rolling back.

The solids at ignition hit them like a battering ram. Even Steve was caught by surprise. Lying in a semi-supine position with the spacecraft pointed straight up, wings folded within the shroud, he'd expected a jolt somewhat stronger than he'd known in the Saturn V. But this wasn't a jolt. When the massive solids ignited there was no thrust buildup. One moment they were waiting, expectant; the next instant an invisible hand squeezed, mashed them downward into the seats. The g-meter seemed to jump from zero, and Steve heard Page gasp at the punch of acceleration.

"Hang on," he called to her. "It gets worse before it gets better."

He heard her sucking in air, forcing herself to breathe deeply, and then her voice, surprised, strained and at the same time elated, came to him.

"My . . . my God," she forced out.

"Careful there. You're liable to get an answer where you're going."

To his delight, she even managed a laugh. "Nothing would surprise me." A long pause, the strain getting more obvious. "I guess—"

"Knock it off, Page. Save your breath. You'll need it." He hesitated as he glanced at the panel. He wasn't hooked into the ship yet. The connections were all closed, but subjecting him to a symbiotic relationship during the punch of acceleration could have saturated every one of his sensors. During ascent he'd ride this thing like he'd always pushed one of the howling beasts—a man watching with hawklike attention the flaming thunder of his own trail.

The panel readouts showed the acceleration at optimum—which meant it was precisely what had been predicted.

He couldn't see outside the Asp because of the shroud, and mission control was staying off direct communications by voice just in case they were being monitored during the critical phase of boosting into orbit. But Steve didn't need anyone holding his hand through a voice channel. He had the panel readout before him; the computer kept flashing the data on time elapsed from ignition, altitude, range from launch, time to different burn sequences—it was all there, and unless a crisis happened there'd be no need for conversation.

He'd never pulled more than 5-g in a climbing rocket before, and now they were running past 8-g and still punching. It would indeed get somewhat worse before it got better.

"Page, still there?"

". . . fine."

"Hang in. Eight g's. Coming up on max."

They felt a shuddering vibration as the Titan 3X rammed through maximum aerodynamic pressure. Then the rumbling

went away and they felt only the strong, deep vibrations of the solid motors flaming. Finally the seconds wore away.

They peaked at 11-g, and were taking a hammering. . . . But he'd ridden the centrifuge at 14-g for sixty seconds and managed to keep talking. "Get—ready—for—BECO," he told Page, forcing each word from between his teeth. The last seconds flashed behind them and the solids cut off.

The sudden change from 11-g to several seconds of coast was almost worse than the squeezing punishment. As acceleration stopped they were thrown hard against their harnesses. Steve was ready for it, letting the air explode away from his lungs, breathing in deeply as quickly as his lungs were emptied. He hoped Page was doing the same; otherwise those first few seconds when the twin-chambered liquid stage ignited and built up thrust could be mean on her. There wasn't time to talk about it.

Seconds after the solids burned out, a series of staccato explosions ripped along the outside of the booster assembly. The blasts were the pyrotechnic charges hurling away the now useless solid rockets. A green light flashed on Steve's console and he kept his right hand ready to hit the manual ignition switch if—

Far below them the twin chambers of the main booster came to life, a softer punch than the battering ram of the solids. Steve watched the propulsion system readout. On the money. Fuel flow, pressure, temperatures, thrust, acceleration—right where they all belonged, in the green. This time the acceleration built more slowly, and consequently was much easier to take.

A warning light flashed. "Hang on," he called to Page. No time for an answer. Three seconds later another series of small explosions, much closer this time, as the pyrotechnics

split the clamshell shroud in two and hurled it away. Light blasted into the spaceship, and Steve pawed at his external visor to block out the sun.

"Page, you reading?"

"Uh . . . fine. Hanging in . . . just fine, Steve. It's . . . God, it's beautiful."

And it was. They were already high over the Atlantic, the horizon of the earth bending sharply, the curvature gaining with every passing second as the Titan raced into vacuum. By now they were so high and going so fast Steve was able to disarm emergency ignition of the Asp engine. If anything went wrong now they needed only to separate from the booster. They could soar high enough and far enough to come back down under full control.

He watched the panel. The computer was still working away at its long list of chores. To either side of them the sunlight came in stronger as the scimitar wings unfolded. Green lights flashed to show the wings locked into position. Steve kept watching the board. One by one the other lights came on, signifying thruster lines activated, thrusters armed and hot for firing, aerodynamic control surfaces locked into position. The ejection system was shut down and closed off from inadvertent activation. Being blown out of your ship at this height could ruin your whole day. . . .

A warning light flashed. "I'm ready," Steve heard before he had time to warn Page. The twin chambers far below them had burned out, and the computer shut down the engines before they had time to tail off with intermittent burning from fuel exhaustion. They got a clean separation, seeing a sudden white flash as the explosive bolts fired and spat away the empty shell of the main stage. Again the short coasting period of weightlessness, and the second stage of the

core booster slammed into life. Once again the acceleration was easy to take, and they knew they'd have a slow buildup to 4-g before shutdown.

By now they were enjoying the flight. A green light flashed, and Steve knew they had it made. Even if the final booster stage tailed them now, they had velocity in the bank. The Asp itself had more than enough energy to fling them into orbit, and with each passing second they were gaining extra time and energy for what they had come up here to do—rendezvous with the abandoned space station.

Other lights came on, signifying that tracking stations far below them had picked them up and had a clear radar signature of their passage. Still they stayed off voice communication. Mission control had telemetry readouts of spacecraft and booster performance. They were being tracked on the money, and through the boost phase biomedical telemetry told Rudy Wells everything he needed to know about their physical condition. There was still another signal. At regular intervals during this part of the mission Steve pressed a button detent on the panel, and Page did the same, a manual operation establishing that everything was working as planned.

The last booster warning light flashed; the seconds whipped away. Engine shutdown. Weightlessness. A feeling of fullness in the head, floating forward against the straps. Steve ignored it. The automatics were still working perfectly and the explosive bolts fired, cutting the spacecraft away from the last stage of the rocket beneath them.

The panel told them the story. They were within one percent of predicted height, velocity and track. Steve studied the panel. Ninety percent of velocity needed for initial orbit. They'd coast along a ballistic trajectory for seven minutes; then he'd bring in the Asp engine.

He interrogated the computer, getting back the information he needed. Full confirmation of original flight plan.

Another light flashed. They were free now for voice communication. Everything would be scrambled so there'd be no chance of the Russians or anyone else picking up their communications. A steady telemetry signal would be beamed to and from the spacecraft whenever they were in range of the ARIA aircraft or ground stations, and their communications would be buried within the greater signal noise.

"Flight to Asp. You copy, Steve?"

They weren't standing on ceremony. "Five by, flight. We're into coast period. Four minutes to go. Tell the launch crew they earned their pay."

"You look fine from here too. Please give me numbers verification on your propulsion system. Over."

Steve tapped buttons on the computer console, read off the numbers; flight control acknowledged.

Two minutes to go. Steve heard Page come into the link. "Flight from two. We're going to activate the sym link within three minutes after engine shutdown. Acknowledge, please."

Steve shook his head. You'd think Page had been doing this all her life.

"Roger that, two," flight called back.

"We will be off communication except from myself for an undetermined time," Page added.

"Read you loud and clear, Asp two. Please go to continuous broadcast mode so we can voice-monitor your cabin exchange. We won't break in or call until we hear from you. Over."

"Very good, flight."

But they weren't there yet. "Sixty seconds to ignition," Steve said.

"Sixty seconds," flight acknowledged.

Steve didn't bother with words. At this point he was in direct control of the spacecraft, and he was going to be a busy dude for a while.

The seconds fled on the digital readout.

Engine ignition. The Asp came alive with 10,000 pounds of thrust, edging them into their seats, a comfortable ride. Steve eased the throttle forward, went to 40,000 pounds of push, and the Asp rode an invisible curving line that three hours later would take it to visual contact—initial rendezvous—with Skylab.

Again the computer flashed its signals. Steve came back on the throttle as the cutoff light blinked alive. The next several minutes he spent talking with the computer, punching in the interrogation and getting readout confirmations.

Two hours, fifty-six minutes to go.

Now Page Rossi would earn her flight pay. Steve knew she was going through her own elaborate checklist.

"Confirm all systems to auto," she told him.

"Auto it is." Asp would take care of itself from here on. Or at least until he took over directly.

"Symbot link in three minutes, Steve."

"Got it."

"It's important for you to be as relaxed as possible."

"I'm almost asleep."

"I want to remind you . . . we'll be on less than thirty percent input."

"Right."

"You *must* remember that you'll be getting only a weak indication of the Asp systems. I want you to close your eyes at least thirty seconds before we—"

"Plug me in?"

Pause. "Yes. That's less than a minute from now."

He looked at the utter blackness about them, the rounded hulk of the planet below. He started a flip remark, but the sight of that massive, gleaming world stopped him.

He wondered what it would be like when he opened his eyes and saw that world as the spacecraft saw it . . . and he forced himself to remember that his sensors would be working at less than one-third capacity. Anything missing, though, would be made up by his own control.

"Steve, please close your eyes now."

He took a deep breath. And waited.

CHAPTER 16

Floating.

Weightless . . . but more than that.

Strength.

Enormous strength but . . . hazy . . . idle, that was it. Power to spare.

Sensitive. Everything so . . . alive.

He could hear. Hear? In space? In vacuum? Impossible. But it was true! He heard . . . ultraviolet, a steady pattering on his skin—

"Steve, this is Page. Do you hear me?"

"Yes."

"I want you to lie still. Don't move your arms or legs, don't turn your head. Do you understand?"

Stop annoying me. I—"Yes."

"Remember, don't move. All right, Steve. Open your eyes."

Glorious . . . dazzling. For the first time in my life . . . now I know what sensitive really means! Everything is so sharp . . . clear . . .

"How . . . how is it, Steve?"

He forced himself to concentrate. "It's unbelievable."

"What's your first sensation?"

"I'm *alive*. For the first time."

"Tell me what you feel, see, hear."

"I've been blind and dumb and deaf all my life. I can *hear* the ultraviolet . . . the infrared is warm, glowing . . . it comes in, well, in waves, with sudden silent blows . . . must be solar reflection from earth . . . one side of me . . . thermal effect is strong. Other side, cooling rapidly."

Page couldn't have been more pleased. *As the spacecraft itself*, and not the man monitoring its systems, Steve was actually *feeling* infrared radiations.

"Signal . . . I'm getting a signal. Laser beam . . ."

That had been programmed. One of the ground stations was sending a laser beam into their flight path. It was weak, barely detectable, its only purpose to activate the Asp's laser sensors. And Steve had *felt* it.

"Means of detection, Steve."

"Slight . . . pressure. Skin pressure."

That would blow some minds back at the bionics lab. No one had figured on that kind of reaction.

"Take it very slow, Steve," she warned. She had already detected the first signs of identity problems, the mixup within Steve as to which was the more real—himself-Steve or himself-Asp.

Thank God they'd programmed for only thirty percent input! Had Steve received the full impact of identification with the spacecraft, the total gestalt, there was every chance he couldn't have handled it.

She had a regular program of "awakening" for him, the kind of test that could only be made right where they were—falling weightlessly at the end tether of their cen-

trifugal string of orbit. But not yet. He wasn't ready. The impact was still too overwhelming.

"Steve."

A long pause. Then she heard his voice, distant. "Yes?"

"We're going to delay systems testing for a little while."

"Why?"

"I want you to get . . . better acquainted with the ship." My God, she was treating him like a child.

"Yeah, Page. That's fine."

A much longer silence, then—"Page?"

"Go ahead, Steve."

"Did you know that radio waves have color?"

The question startled her. "Say that again?"

"Radio waves. The whole spectrum is banded. I can *see* them. They're like rainbow patterns overlapping one another." His voice was picking up strength, she was grateful to note.

"I'm . . . I'm beginning to handle it now. I meant what I said about radio. The frequencies shift according to wave length. I think that . . . if we knew how to handle it, we could communicate with the radio wave lengths themselves."

"What else, Steve?"

"I'm going to try something."

"*Not yet, Steve.*"

"Just relax, I'm tweaking my muscles."

It took her a long moment to realize what he meant by "muscles." Abruptly the aft thrusters fired, shut down at once. Moments later Steve fired the nose thrusters to cancel out the additional velocity.

"Roll coming up, Page. To the left."

She held her breath and unsuccessfully tried to cross her fingers in a pressurized glove.

A moment later she heard the sound of thrusters firing

again, cutting out immediately. The curving horizon far beneath them rolled steadily, majestically, as Steve brought the Asp through a complete roll. He stopped the motion with the touch of a surgeon.

"My God . . ."

"What's wrong, Steve!"

"There's nothing *wrong* . . ." She could detect the awe, and exhilaration, in his voice.

"I did all that . . . with body English."

She let out her breath. "Any problems?"

"No, none at all. I mean, I thought about what I wanted to do and I leaned into the turn and I was rolling . . ."

He had crossed the bridge. Gestalt. He had identification with the spacecraft.

Don't hedge, she berated herself. It's more than identification. He's becoming the ship . . . Again she thanked the good fortune that had dictated her decision to hold the symbiotic link to only thirty percent of that available.

"Steve, the checklist. Have you got it in front of you?"

". . . I was just feeling the solar wind. It's like a . . . a breeze out there. I wonder what it's like in a proton storm? I'd like to feel that. You know something, Page? Ever watch a rainstorm miles away from where you're standing? That's what the Van Allen radiation belts look like . . . a misty storm in the distance."

"*The checklist*," she reminded him sharply.

"Uh, yeah. Got it."

"Then we've got a job to do, Colonel Austin." She put all the business she could manage into her voice. "Shall we get to it?"

"Oh, sure. Anytime you're ready."

"I'm ready *now*," she said, her voice deliberately angry needing to jar him off his cloud. "Please activate the console readout."

Her own screen came suddenly alive, a duplicate of the electronic printout directly in front of Steve. She knew that once she got him going on the procedures they had to follow with the checklist of testing systems, he'd revert to being efficient, disciplined.

It worked. Little by little he emerged from that rosy glow he'd accumulated about his Steve-Asp personality. Page went through the checklist with the chill still in her voice, constantly prodding him, demanding answers and interpretations as they went along. Within a half-hour Steve was again himself, functional as his own personality as well as that of the spacecraft.

When they went into a series of thruster checkouts to determine reaction time—she would hit a random sequence of light buttons on her console to reveal these as flashes to Steve, to which he had to react within specified times—he was again working as a test pilot.

They were through the worst of it now, she was convinced. He had been nearly seduced by sensitivities and power he could never in his wildest dreams have imagined—and come out of it whole. But it was almost time to get back to their mission with the Skylab. Soon they would have the space station in sight and they'd—

"Skylab contact." His voice came through to her with abrupt suddenness; he was Steve-Asp. His radar systems . . . of course. "Bearing zero three zero. Range three one miles. At present closure rate . . . no, hold it. We've got an unanticipated drift. We'll need some additional velocity to continue closure."

She put all her trust in his capacity to handle it by himself. "Go ahead, Steve."

He didn't reply but through the mirrors she saw him moving, then settling down. She watched intently. His body leaned forward slightly and acceleration nudged her into her

seat. Seven seconds at minimum thrust was all he gave the big engine. There was a slight roll, the Asp turning along its axis, and another power burst.

"We're dead-on," his voice came to her. "Nine minutes."

"Got it, Steve. Procedures for docking, please."

"Soft docking. Shutdown main propulsion systems. Laser proximity hold after tethering."

"Right." She crossed mental fingers. "You will remain on sym link until rendezvous and soft docking. Sym link disconnect will take place then."

He didn't answer and she didn't push him. She knew what was going on in his head. The thought, just the *thought* of disconnecting from the Asp with the symbot links had frozen his voice. She was glad she'd brought it up now. He'd need the time in which to adjust.

Skylab expanded slowly in size like a giant space whale drifting toward them. The station was remarkably well-preserved in the exterior view. There had been outgassing of paint and metal from its surface, and there were darkened areas on the big solar cells, but the huge vessel still reflected sunlight with dazzling clarity. All about the great station was a glow that, especially when it caught the sun at the right angle, turned into a shimmering corona. This, Page knew, was the cloud of gases and other materials that had come from the station and were actually orbiting the Skylab as the station itself orbited the planet.

The sight was as awesome as she had anticipated, and her thoughts were mixed with memories of three crews of men who had journeyed to this same station and lived here, in the case of the last trio, for 84 days. She thought of Pete Conrad and his feat of "saving" the station by unlocking the jammed

solar-panel wing directly before her. And then she forced all these thoughts from her mind to concentrate on what had to be done.

The station, NASA had told the Air Force, still had more than enough thruster supply to maintain steady attitude for several days' "constant requirement." And by the time the Asp reached the station they could see NASA had been right. The station sensors had "locked" onto the horizon and the Skylab was rock-steady.

Steve eased the Asp alongside the Skylab and turned position-holding over to the automatics. They couldn't just leave the Asp untethered when they went inside the station, and yet they needed some control over the spacecraft. The solution was to have distance sensors on the Asp "lock" onto the station, with the computer assuring, through tweaking the thrusters, that the spacecraft would never exceed one hundred feet from Skylab, nor be any closer than thirty feet. Easy enough, with the drift now down to minimal. It would increase from the motion of their own bodies in leaving the Asp, but the automatics could handle station-keeping, backed up by two tether lines, without difficulty.

The real problem was in disengaging Steve from the Asp—which, Page feared, had assumed all the proportions of wrenching half his emotional self from himself.

"Steve, the checklist calls for disconnect."

"I know."

"Steve, I want more than you telling me you know—"

"Like what, then?"

"Initiate disconnect checklist. *Now*."

"I—"

"Initiate disconnect checklist. Engine arm to off."

"Uh . . . arm to off."

She had to keep him moving.

"Thrusters, off."

He hesitated, then made the move. "Off."

"Call it out, please,"

"Thrusters off."

They were safe from any sudden power maneuvers now. That was the first and single most important move. She lifted her gloved fingers away from the master cutoff switch. Steve didn't even know that she had that capability, to power down the Asp with a single move. Now she knew she wouldn't need it. They went through the checklist slowly. Bit by bit, piece by piece, link by link Steve separated one part of his innermost self from another.

Finally it was done. She knew Rudy Wells, back in flight control, was studying with alarm the biosensor telemetry on Steve. He had gone into a severe slump. For the moment he was swimming upstream and she knew how tough it was. She waited as long as she could.

"Steve, you read me?"

His voice seemed to be dragging up from some deep well. "Uh, yes. Read you. Page?"

"Yes, Steve." She was alarmed at the suddenly plaintive sound in his voice.

"Page . . . my God, I feel . . . like I'm part blind and deaf and dumb, like I'm in a black fog . . ."

So even at one-third intensity he had gone that deep into the symbiotic link! Her very success at what she had done had almost wrecked this man! She made her decision then and moved her master cutoff. Steve had severed the last sym link with the Asp and was back to pilot status, but Page wasn't taking any more chances. Now he wouldn't be able to return to the ship in the symbiotic mode even if he wanted to.

"Steve, listen to me. Open your helmet. Take the food package from your side kit. The orange one. You need energy as fast as you can get it." She paused. "I don't think

we need drugs for the pickup. Just some high-energy food will do."

It took nearly a minute for him to emerge from his lethargy. He consumed the high-energy rations in wolfish bites. Then he was back into the kit for two more. Page relaxed. Within thirty minutes he was his old self again. She knew that when the objectivity returned to his voice.

He was also distant from her. She understood that. The experiences he had *felt*. He was objective about breaking the sym link. He had to do it. But he didn't want to and he didn't feel very friendly toward anyone right now. Which was all right. Let him concentrate on his work.

"Suit integrity check," he snapped. "We'll begin setting up for the EVA."

"Right. Suit check."

They went through the checklist, Steve sounding even colder and harder. She'd never known him to be like this, and she was taken aback with the intensity of his anger. She didn't dare comment. He was the absolute master of what they were doing and she obeyed every order instantly and with efficiency.

They depressurized the cockpit, and the big canopy slid up and back on its telescoping arm. Steve told her to stay strapped in, to get accustomed to the feeling of the suit under vacuum. They were both on backpack life-support systems now. He hooked his tether to the ship and with a gentle nudge drifted up and to the side. The feeling of watching the man drifting weightless was unreal, overwhelming. He brought the small reaction gun with its two nozzles into play, fired two short bursts and drifted to the space station airlock. He worked for perhaps ten minutes. He secured two tether lines to the Skylab. Then he returned to the ship.

"Activate autohold," he ordered. She switched on the laser systems that, when the Asp drifted to within thirty feet

of the station, would fire thrusters to move it back out to a hundred feet. In this fashion the two spacecraft would be kept from bumping, and the tethers would assure that the Asp wouldn't drift away.

He watched her closely as she floated from the spaceship. He held her harness straps with one hand and used the other to fire the reaction gun. The sense of unreality became even greater as the Asp seemed to move slowly away from them. To her left and down was the massive globe of the earth, and she saw the terminator line separating day from night.

"We're almost there," he told her. Moments later she felt the movement stop as they reached the station. He helped her into the airlock adaptor. "Unhook your tether," he told her, then fastened both tethers to holds in the adaptor.

"Follow me." That was all as he propelled himself into the cavernous holds of the Skylab. There he took motion-picture film of Page moving from one deck level to another. She did the same of Steve, using closeups as he unfastened the special equipment left by the last Skylab crew for just this moment. They spent forty minutes in the station. She wondered what it had been like up here, free of the encumbrance of the heavy pressure suits. Three months of weightlessness! Being able to move with no more effort than pushing against a wall with only a finger and—"

"Knock off the daydreaming." The words took her by surprise. She turned, spinning clumsily, catching herself with a groping hand. Steve tapped the watch on his wrist. "Fifteen minutes and we're down to reserves. Let's go."

They floated as feathers through the length of the space station. In the airlock adaptor he hooked up her tether, double-checked her oxygen pressure, helped her through the hatch.

The universe loomed impossibly huge before her. There was a moment of vertigo, coming from the enclosed area of

the Skylab. She didn't know she was groping wildly until she felt Steve's hands on her.

"Easy, don't fight it. Just hang in there. No sudden movements. Now, breathe deeply."

She did so. "I—I'm all right now. Thanks."

He had her harness again. His feet were against the station and he pushed away to start their drift back to the waiting Asp. Twice he fired the reaction gun, then they were at the ship and he was helping her into the rear cockpit. Once she had handholds within the Asp she recovered completely. He watched her as she hooked up, switched to the Asp supply of oxygen and power. He handed her the equipment they'd taken from the Skylab, then the cameras, watching to see that they were stowed properly. He cut free the tether lines that linked them to the Skylab space station. She marveled at his ease in weightlessness, as if he'd been born to moving in zero-g. Of course, there had been that long flight to and from the moon—a week of being weightless—and the EVA he'd done then from the Apollo. But still, his movements were so graceful.

He eased into the front cockpit and hooked up to the ship. He brought in power. "Canopy coming down. Clear?"

"Clear," she told him, and the big clamshell lowered about her. The autolocks ground home and the green light winked on. Moments later they had 5.5 psi in the cockpit and they both disconnected from the backpack systems. Ten minutes later Steve was through his checklist of bringing the Asp back to life.

A sharp thruster burn carried them several hundred yards from the space station. Page had nothing to do now but watch, and enjoy the sensations of their flight. Steve rotated the ship so that the big engine pointed in the direction of their flight. He went through several minutes of interrogating the onboard computer, and for the first time since they'd returned

to the Asp he made contact with Flight Control.

The ground computers were in accord. "Seven minutes," Steve announced.

She spent the time staring at the earth, marveling at the wonder of these past hours. Then the time was gone, she braced herself, and Steve fired a long steady burn from the main engine. The computer verified the burn; they'd slashed velocity precisely as predicted and were starting their long, shallow fall back to the earth.

Reentry was coming back into the earth's atmosphere at nearly five miles a second, plunging downward through a fiery orange gout of friction-born flame . . . she knew she'd never forget it.

They punched back into atmosphere over the Pacific Ocean. Below them they saw contrails painting thin white ribbons through the air. A C-5A had taken off from Edwards Air Force Base with a dummy Asp clamped atop its fuselage mount. Over the ocean, far from any observers, the dummy ship was released to dive into the ocean and disappear.

As far as the world knew, another test flight with a scimitar-winged shape was under way. The C-5A had left with an Asp, and was returning without its cargo.

Steve brought her down onto the desert floor fast and smooth. With a strange detachment she watched the vehicles rushing toward them to unhook them from the spacecraft.

She felt oppressed—gravity . . .

After weightlessness, after experiencing that marvelous sensation no earthbound creature could ever know, the earth felt like a prison.

And she understood, more deeply than she'd thought possible, why Steve had hated to break the sym links with the Asp.

It must be awful to go back to being only a shell of what you were.

CHAPTER 17

"Then you'd say this initial test met all your goals?" Oscar Goldman tapped a pencil on the conference table. It took far more effort than Dr. Page Rossi or the others in the room could have imagined for Goldman to camouflage his jubilation. The last thing he wanted to do was reveal just how important the symbot program was to OSO, which was gambling on a good deal more than the experiences of Steve Austin with the Asp spacecraft. OSO was gambling time and money and the considerable effort of Oscar Goldman and a small group who'd been working in this field for years—but with only a fraction of the success Dr. Page Rossi had achieved on this first flight with Austin.

Page shook her head. "No, no, Mr. Goldman," she said quickly. "Perhaps I didn't make myself clear. We flew this mission, as you know, at thirty-two percent effective sym link because it was impossible to predict the intensity of link and subsequent actions until we actually experienced freedom of movement in weightlessness. Still, even at this reduced

sym level, Steve was, well, he *was*, in many ways, the spacecraft itself. What I couldn't tell ahead of time was that despite his programmed limited effectiveness in spacecraft operations his gestalt with—"

"His what?"

"Gestalt. His total identification with the spacecraft . . . two minds and two bodies—man and machine—literally joined as a single entity."

"You feel it was that complete?"

"It was . . . incredible wouldn't be too strong a word for it. That was the problem. The identity, the forming into a single identity, was so powerful it almost blanked out Steve Austin as an individual. It was the impact, and the lack of resistance on Steve's part, that surprised me. Dr. Wells and I had anticipated some basic resistance to this lack of identity, but what happened was that Steve didn't *lose* anything, at least from his point of view. He gained. He added on to himself."

"Page, what do you expect will happen when you go to full intensity?" Ted Anderson asked.

She shook her head. "He will *be* the spacecraft, Ted. And the spacecraft will be him. What's so remarkable is the link, not only between Steve as a biological mechanism with the sensors of the Asp, but the identity, rapport, if you will, that was established between the ship's computer and Steve's mind. It was as though Steve gave up his body to the in-space superior systems of Asp, and the computer in turn yielded to Steve's control.

"I really don't know how deep it will go when we release the blocks and let those two—" She smiled. "I'm doing it myself, I'm thinking of the man and the machine as a single identity." The smile left as she thought back. "But I *had* to do that. I didn't dare to talk to Steve Austin as an

individual—and I certainly couldn't communicate directly with the Asp computer as a cybernetics system—because Steve, as I knew him, no longer existed. And neither did the ship! I had no *choice* but to approach, communicate with a single entity up there. Because that's what there was."

Rudy Wells asked, "Do you believe you'll be able to communicate with Steve so he'll follow mission orders? I mean, if you were sent up again, this time on a mission involving split-second timing, swift evaluation and aggressive action . . . and with Steve linked *totally* in symbiosis with the spacecraft, could you still effectively communicate with him?"

"I believe so, Dr. Wells."

Goldman's voice came across the room. "You *believe* so? Don't you *know*?"

She shook her head. "*Knowing* something, Mr. Goldman, takes twenty-twenty hindsight. Until I fly such a mission I can only believe something, no matter how well I may anticipate. . . . And I gather your question isn't academic, right?"

"No, Dr. Rossi, it isn't."

"We've got to get moving for another mission as quickly as possible," Ted Anderson told her.

"But it's only been nine days since we got back! We haven't even reduced all our data yet. I'm planning another month of tests and—"

"We don't have that month."

"But he won't be ready, not for another *two* months at least."

"He may not be ready from your point of view as a scientist—"

"As a *doctor*—"

"I'm sorry, but *Doctor* Wells is going to overrule you,

Page. As long as Steve is fit to fly, we will have to consider him ready for the mission—in the full symbot configuration."

It was Goldman now. "I understand your position, Dr. Rossi, but perhaps you'd better listen to ours as well. The Apollo-Soyuz mission was a resounding success. The world applauds the hands of friendship extended in orbit. To the astronauts involved, the ground teams, to almost everybody, in fact, it was one of the best moves for peace now and for future joint space efforts.

"Unfortunately it was also window dressing. In front of the world the Russians have asked for another Apollo-Soyuz mission. They also know enough about our hardware and budget problems to know that Congress won't respond and the mission won't come off. In the meantime, doctor, they have made two manned flights in polar orbit. Do you understand what I'm saying? Two manned flights with their new Storm spacecraft, and not a single word to anyone about it. They apparently have great confidence in their manned systems, because rescue along polar orbit is a most hairy business indeed. And their cosmonauts are simply following orders regardless . . . as, indeed, would ours.

"Now, while they beat the press drums for another joint mission, they're developing a very real and, for us, extremely dangerous *manned* military capability for offensive operations in space. The danger goes beyond the fact that they're upstairs and we aren't. If they get away with too much they're very tempted to feel they can get away with a lot more, which in turn encourages them to push us harder and we are forced to dig in our heels and too soon we're both over a very deep precipice. It's the kind of brinkmanship that invites war. Those two manned Storms of theirs managed to tear the life out of two of our Big Bird recon satellites. We're

in deep trouble. We have got to take positive steps to counter what's happening to us. I've met with members of the Congress on this. They've given us the green light. Your mission with the Asp to the space station accomplished everything we hoped it would—from your point of view as well as ours."

Goldman appraised her mood, and threw away his preliminary moves. "Dr. Rossi—Colonel Rossi—Intelligence has learned the Russians will launch another manned spacecraft some seventeen days from now. We've determined that they have timed their launch carefully for some thirty-six hours after we launch another Big Bird—and they're going after it with a Storm, complete with men using weapons."

Goldman paused long enough to glance at Anderson and Wells. Both men nodded in response to the unspoken query. Goldman then turned back to Page Rossi. "We'll need you to be ready to launch with an Asp from Vandenberg in the same period of time, doctor. Seventeen days from now. Not only that, we want Steve Austin ready and able to perform as the ship, with full symbiotic link, and with full weapons capacity—"

"But we're into the most sensitive and delicate experiments you can possibly imagine. Steve Austin took an emotional whipping up there. I don't believe he'll be ready—"

"We're never really ready," Anderson said. He shook his head to hold off further objections. "Page, we realize you never bargained for this. No one ever said anything to you about risking *your* life on an armed mission. We're certainly not ordering you to go but we are—"

"There's no question about my going. Steve would never survive without me. You've called me a babysitter. You were more right than you knew. Because if something goes wrong

when the sym link is at full capacity, Steve is programmed to go unconscious."

She stood up. "And I'm the only one who could bring him out of it."

CHAPTER 18

There was none of the exhiliration that had preceded her first boost into orbit from Cape Canaveral. She was too worried about the pace at which Steve was being pushed into the full symbiotic link with the Asp.

She understood and was hardly indifferent to the likelihood that she and Steve might be facing armed cosmonauts whose mission, once they were discovered chewing up one of the U.S.'s big reconnaissance satellites, might well call for the destruction of the Americans. She also realized they would be boosting along a polar orbit and that rescue, short of descending where planned, was something that depended on where they might emerge from vacuum and knife back into waiting atmosphere. But Steve was especially her concern.

He was more than an ordinary human being. He was the extraordinary, the unique promise for human beings of the future. Man wouldn't forever remain on his home planet. He had already begun to move to other worlds, and so long as

his spirit remained he would keep reaching out to other worlds. He couldn't do it alone. He needed the foundation of his technology and his science as he had never needed an ally before. But it was one thing to move outward in clumsy and dangerous fashion, and quite another to create this oneness between man and machine and computer so that as a single entity this newly born might well expect to conquer the worlds waiting for him.

Steve Austin, preeminently the future's promise, was being risked for the sake of an immediate political and military goal. The society—the very men—who had made Steve and his promise possible were risking his destruction. Of course, it was no easy dilemma—but she felt they were wrong in their assignment of priorities. She could not deny, though, that her very commitment to Steve obliged her to go along with them—as she knew Steve would—regardless of her convictions. She would go and she would be as involved in the military operations of these people as much as Goldman or Anderson or Rudy Wells.

Rudy Wells . . . at least he among all of them must share much of her own feelings. And suddenly she felt a special compassion for—and closeness to—this good man who more than any other had made Steve Austin possible.

They'd wasted no time with the new Asp. Page took the elevator to the white room atop the service tower at Vandenberg Air Force Base, which was nestled in rolling wooded hills that overlooked the Pacific Ocean. There she would work day and night to assure that the machine was ready to receive its complement of two—herself, and Steve Austin.

Externally the Asp had changed. There were protuberances along that sleek belly, pods for rockets, with the pods capable of being extended from the hull so they could swivel

in any direction before firing. Several larger missiles were buried within the hull to be extended on launch racks when their use was needed. She didn't know how many rockets were contained within the machine, but she knew she'd find out soon enough. What chilled her more than anything else was the reality of what she'd heard Steve describe so many weeks before—a turret, flattened, with a single barrel extending from its bulk.

She studied the front cockpit, where Steve would be strapped down and hooked symbiotically into the Asp. There were changes in certain controls, all based on her recommendations after the flight to Skylab. There was also a complete new bank of switches and controls, and the ordnance display and firing mechanisms. She shuddered and climbed back to her cockpit in the aft position.

No backpacks and tethers this time, though. On this mission they'd stay with the Asp all the way. She was glad of that. She doubted that she would ever be able to get Steve to disconnect from his sym links once he was hooked in at full capacity. It would take the return to earth to accomplish that. The Asp would have to be back on hard ground, unmoving, pinned by gravity to the desert floor and powered down before she'd ever break Steve off.

And there was always the chance, she knew, that the sym links could be so overpowering he might never return.

She had done all there was to do. Steve had been checked out, the suits were ready, the booster was ready and fueled and waiting. The sym links had been checked repeatedly. The launch teams were on alert with a second team on standby. Aircraft and ships were in position, waiting.

The Russians swallowed the bait. Colonel Anderson brought the news to them as they waited in the crew readi-

ness quarters. "The Russians have already put up one ship," he told them. "The Storm began closing in on the Big Bird a few hours ago. They're having some problems getting rendezvous, but nothing they won't overcome soon enough. What they don't know is that this particular Big Bird is configured to pick up everything they're doing in orbit. It's already locked onto them with sensors and cameras that are picking up significant details of their Storm and sending them back down here both in real-time and burst transmission. The moment they get close, as we'll tell from the reconsat, you go. Be ready to move out in one hour from now."

They didn't make it. The Russians' ship had more problems than the Russians were able to handle; they burned off more fuel than had been planned for, so they aborted. Page Rossi felt enormous relief, but it didn't last long. "They have a second ship on the pad ready to go," Ted Anderson told her. "We'll let you know."

"God, if only I could get some sleep," she said to Rudy. He studied her carefully, checked with Anderson. At least six hours before they'd know what the new capabilities of the Russian Storm would be.

"You can sleep," Rudy told her. Whatever was in the pill he gave her worked like a sledgehammer. She got five hours, out of the world completely, before they went to launch alert.

"We're on," Anderson told them. This time he didn't leave crew quarters. He went with Steve to be suited up while Wells accompanied Page. She was numb through it all, leaving the worrying to Rudy and the suit technicians.

This time they went straight to the pad in their white van. Full security on the base; no problems with newsmen. Insertion with the Asp went smoothly. They were hooked into the ship, the hatch was closed and the shroud was lowered.

At T minus eighteen minutes the count went to hold. For three and a half agonizing hours they sweated out the delay. The Russians again; problems with closing in for tight rendezvous with the Big Bird.

Then the Russians were there. The reconsat had sent back pictures of a hatch opening in the Russian spacecraft.

"Asp, we're picking up the count in three minutes."

"I was wondering if you'd ever punch our tickets," Steve came back.

They picked up the count; the eighteen minutes went steadily, if not swiftly, with the countdown checklists being ticked off one after the other. Then they were down to seconds, and this time Page knew what to do, bracing herself, and when the giant solid boosters ignited and the acceleration kicked her, she welcomed the hammering blow.

Because by now she had blocked out of her mind everything but the safety and the life of the man in front of her.

The earth plunged away beneath them.

CHAPTER 19

She didn't have much time for sightseeing as they boosted away from Vandenberg, an ascent that took them southward from California and over the ocean. By the time they reached the equator they were at orbital altitude, 110 miles above the earth, and the boosters were being jettisoned as though empty freight cars of a swiftly accelerating train. Their flight plan called for them to slide into the same orbit as the Big Bird satellite while still far behind the reconsat and its Russian company. Then, when all systems had been checked out and Steve was in full sym link with the Asp, he would be "turned loose" to close in on their quarry—the Russian Storm.

They were more than a quarter of the distance around the planet by the time Page had completed her preliminary cockpit checkout. She realized with a start, and then with a smile, how swiftly this time she had adapted to zero-g. She'd been so engrossed in her work, with "her head in the cockpit," that it was a surprise to realize she had been weightless for long minutes and had accepted the condition as

natural. She also accepted as normal the confines of the pressure suit, as well as the cockpit with its banks of consoles, panels, switches and controls all about her. She had talked with Steve only in brief technical terms related to spacecraft operation. Then he called her again but with a tone that had been absent from his voice until this moment.

"Page, you read?"

His call shook her from her concentration. "Yes, Steve, what is it?"

"I'm going to—wait a moment. Keep your head down in the cockpit, don't look outside the ship. I'll tell you when to lift up your head. I'm going to pitch so that we're pointed almost straight down. When I tell you to come out of the hole, just look straight ahead."

Moments later she heard the thrusters firing and knew the ship was pitching down by the nose. Then the thrusters fired again to cancel out the movement. There was a long pause until—

"Page." His voice had a strange tautness to it. "Look up now."

It took her breath away. Spread before her, curving across the end of the planet, stunning in its white mantle, lay the continent of Antarctica. A low sun snapped mountains and ice sheets into stark, shadowed relief, accenting the blinding reflection of light that, even as she watched, mellowed from eye-stabbing brightness to first touches of scalloped pink. The very edge of the world showed knife-edged mountain peaks, washed by the sun, and the jagged edges showed starkly against the black velvet of space itself. She did not have very long to look—their speed was five miles every second—as they fell around the bottom of the world, racing from waning sun into darkness.

It was time to create the new entity—to bring Steve and the spacecraft into oneness.

One by one Steve closed the connections that would bind him physically, mentally, in his soul, to the killer spacecraft.

Page did her best not to empathize too deeply with him, knowing such self-indulgence would deny him the benefits of her skills and experience. So once again she slipped into that mood of mentor and guide, even as she fought down her personal feelings. She went through the computer-readout checklist, Steve doing the same, and, as one connection after another of the sym links was closed, his voice seemed to become ever more distant as his personality itself faded, blending more and more with that of the Asp.

And then—as a feeling more than anything else—Steve slipped away from her. He was completely linked to the Asp, but she had been holding down the intensity of identification-transfer, controlling the extent of the unity by the rheostat on the panel before her. She reached thirty-seven percent when it began, when he began to respond to her checklist announcements and other questions with a detachment she recognized from their first flight.

At forty-six percent the personality of Steve Austin as an individual was *gone*.

Neither could she regard the Asp itself as a machine, no matter how finely tuned and responsive it might have been to its controls, no matter how sensitive it was through its varied systems. At forty-six percent intensity of the sym link the ship was alive, fused with the being and personality of Steve Austin.

They had become *one*.

She knew this when Steve no longer responded to her questions. Now he commanded, and in his voice tone there was the unmistakable expectation of absolute obedience to him from her. She was a prisoner within a system of capabilities far beyond anything she could establish on her own.

The gestalt creation merely tolerated her presence.

"Increase sym link to one hundred percent." His voice came to her as that of the man-machine.

"Not yet," she answered quickly. "I think it's best that we keep the intensity build-up in slow increments, Steve . . ." Her voice faded away as the panel readout indicating sym-link intensity swung to maximum. She twisted the rheostat, knowing as she did so that it would be useless.

"Page, leave the sym controls alone." On their first mission she had spoken to him as she might speak to a child; now their situation was reversed.

"All right, Steve, what do you want me to do?"

"Stay on systems monitoring. If there are any anomalies please let me know at once."

"Yes." She had started to say, "Yes, sir," but bit off the second word.

"Secure your harness," she was told, "I'm going to check out maneuvering systems."

She checked. Snug. She relaxed and forced her helmet back against the headrest. "Let her rip, Steve."

She heard a burst of laughter—free, strong.

And then the Asp began a ballet. The thrusters fired with blinding rapidity, and Steve was controlling *himself*—not the ship, she reminded herself—with a deftness and an agility that would have enraptured any systems engineer. The big engine behind them slammed on and off. The Asp rotated, whirled, rolled, tumbled, skidded, slid from side to side. If a weightless machine could hover along its orbital path, then Steve-Asp would prove it possible.

Ten minutes later he was done. They drifted in weightless flight, as though Steve-Asp were testing the final results of all he had done. She heard his voice again, speaking not to her but to Flight Control.

"Flight, Asp One here."

"Go ahead, One."

"All systems checks completed. Sym link is one hundred percent effective. Over."

There was a hesitation neither one of them could miss. After that extra heartbeat Flight Control responded. "Asp Two, do you confirm?"

"Asp Two here," Page said at once. "Monitoring systems conclusive. Sym link is total. Effectiveness ratio exceeds programming. Over."

No hesitation this time. Page knew that Rudy Wells was monitoring every word, that there had been a hesitation on the TV screens between the launch center and NORAD Flight Control, then the nod from Wells to contact Page—Asp Two—directly.

"Roger that, two. Asp One, are you ready for mission input?"

"Have at it, flight."

"Right, Steve. Are you ready to copy orbital data?"

"Two will copy and communicate with the computer, flight," Steve said. "I'll monitor and utilize. Over."

Again that hesitation. It didn't *sound* like Steve Austin to the flight-control crew, but only Rudy Wells and Ted Anderson knew why. Once again, Page knew, the flight controller had been given the nod to proceed.

There followed a long string of orbital data on the Storm spacecraft holding position with the Big Bird far ahead of them and over the horizon. As fast as Page punched in the data on the computer, she knew she was also communicating, albeit without verbal contact, with the full mental capacity of Steve. When she finished she had no opportunity to reply.

"Flight from one. Got it. In seventy-three seconds I will go to full boost for catch-up mode."

"Got that, one . . . By the way, we've got an optical

lock on the Storm spacecraft. It looks like a four-man job, one At present two cosmonauts are EVA and it appears they are using maneuvering units . . . One, it also seems they're carrying some sort of rocket projectors. It doesn't look like a healthy situation, one."

Flame exploded in vacuum as the Asp howled its way to closing rendezvous with the Storm and its four cosmonauts.

CHAPTER 20

Page couldn't see a thing and had to force herself to remember that Steve-Asp saw across an incredible spectrum denied to her limited, conventional human senses, and that he was capable of ranging far beyond what the human eye could manage in terms of distance. At this moment Steve was seeing with the microwave vision of the spacecraft's radar systems. Page knew that at any moment they'd get confirmation from Flight Control about their distance, closing rate and time of rendezvous, but right now Flight, with all its sophisticated computer systems on the ground, was running *behind* the totality of detection systems and the combination of computer and human brain that was now the Asp.

"Thirty-two miles, closing fast, weapons range in nine minutes," she heard Steve announce to her.

"Asp One from Flight, we have some updates for—"

The voice that came from the front cockpit was sharp, cutting. "Flight from One, I'll handle the flight data from this point on. Do not break into operations unless you have

pertinent data about changing situation of personnel in Storm spacecraft. Repeat, do not break into my operations. Contact Asp Two if necessary. One will not further acknowledge transmission unless Asp Two determines it necessary to interfere. You copy that, Flight?"

This time the delay was so long Steve didn't wait but repeated his request: "Flight from One, confirm copy," Steve said with obvious impatience.

"We confirm your message but—"

Page knew it was time for her to break in. She knew what was happening to Steve-Asp—a complete study of the situation through sensors, the computer and the experience of the skilled astronaut who had something the computer lacked, namely the ability to second-guess the opposition.

"Flight from Two, confirm necessity for message and actions by Asp One. Imperative no interference with One except for emergency. Repeat, no interference with One. Do you understand? Over."

Again there had to be that swift consultation among the control team. Page recognized Anderson's voice and knew the colonel had broken into the line. "Page, we have received, understand, and acknowledge your message. We will stand by."

On the communications link within the spacecraft she heard Steve's voice. "Fine job. Do you have visual contact yet?"

She stared as hard as she could. Was that light a reflection or—

"The binoculars. Use them, Page."

She took the binoculars from their storage case and brought them up—a sudden bang as they slammed into her visor. Ruefully Page opened the visor, brought the glasses to

her eyes. The reflection came into focus. There—the Storm. A big one, all right. And two other reflections . . . the two cosmonauts outside the ship. And to the right of the Russian spacecraft—the long cylinder that was the Big Bird satellite.

"I have them, Steve. Two men outside and—"

"I know," he broke in. "Stow the binoculars and seal your helmet. Be sure you're on suit pressure and oxygen, and activate your emergency systems to standby and automatic."

She did as she was told, working out the why of it all as she complied. If they got into a ruckus the pressure seal of the spacecraft cabin could easily be ruptured. If she was on suit supply, with the emergency system on automatic standby and cut-in, having the hull opened wouldn't for the moment be so dangerous to them.

"All set," she said quickly.

As she watched, the distant scene began to expand from bright reflections to definite shapes and forms. They were at a range of four miles when the forward thrusters of Asp fired a long burst. They held the four-mile separation for only a few moments. Abruptly side thrusters fired, and again there was firing.

"A microwave beam is locked on us," she heard Steve-Asp explain. "It's a missile homing beacon. The system isn't very fast. It takes time for them to home and lock on us and then activate their weapon for firing and continued homing. That little dance messed up their program. They aren't configured for an active target."

Steve-Asp was daring the Russians to do their worst. Coming to a stop as he did, he was baiting the Russians—telling them he understood their systems.

A game of bluff. Could it be possible, Page thought, that the Russians would recognize that the Americans had showed

up with something beyond their expectations and, hopefully, conclude that this scimitar-winged spacecraft wasn't worth testing?

"Steve, do we have to engage in . . . in open fire with these people?"

"We don't *have* to do anything. All *they* have to do is pack and leave. Except I don't think they're going to do that. They can be stubborn."

As he spoke, tiny fingers of flame shot into the vacuum and jerked Asp to one side.

"But that satellite doesn't *matter* that much. . . . It's only equipment, machinery we can easily duplicate. What we've learned with you and this ship, Steve . . . of all people, *you* should understand. . . ."

It shook her to realize it was the spaceship as much as the man making verbal response.

"No, Page, we can't do that."

We—both of them . . . one of them . . .

"There's more at stake here than that reconnaissance satellite. What's happening here is a test. If we can't handle this test, here and now, then the people who sent the people we see out there will make their move to hold and *increase* their position in space. Goldman laid it out for you. . . . It's a matter of power balance. It's not a matter of who is better or worse. You don't blame a scorpion for defending itself with its stinger. It's also in the service of the new detente, this balance. And the big bombs and the armies stay home while a handful of us come up here to test one another. A good trade-off, I'd say."

Silence. Page saw that the Russians were busy, moving around, drifting about under the thrust of their maneuvering units.

"What are you going to do?"

"We go in, get up close. We confuse them. They don't know what cards we're holding out of the game—or which ones we're ready to play."

She reminded herself of what was happening—the man thought and the ship reacted. It was one and the same. The truly unique blend. A manship . . .

They were only two hundred yards away, the Asp moving with remarkable smoothness, perfection of control, slamming to a stop as though hitting a brick wall but perfectly steady. The Russians stared at them. If Page could have seen through the reflective coating of their visors, she would have read expressions of astonishment and disbelief at this strange ship, at how it moved like a living thing.

"Here's the test," he said. "They're moving out to flank us. Too bad. Like you, I'd hoped they would just go home. Now it gets serious."

She noted the monitoring console before her.

The weapons of Asp were armed. Ready to fire.

CHAPTER 21

The first move was a gambit. The cosmonaut free-floating to their left, having maneuvered by bodypack-thrust system, fixed his position and aimed a flaring tube in their direction. Steve-Asp examined what was happening. Telescopic lenses gave him an extraordinary close-up of the cosmonaut and his equipment. Range-fingers told him exactly the distances involved; laser-beam trackers immediately computed the speed of the weapons bursting away from the cosmonaut. Steve-Asp's thermal systems read the infrared signature, and the computer banks deep within the protecting hull of Asp flashed to the human brain the type of rocket fuel, duration of burning, temperature of the flame and the expected velocity, as well as the time it would take the weapons fired at them to reach their target.

Steve was talking aloud, a move to keep Page informed about what was happening. She didn't catch all the words—he was speaking in a monotone, voicing aloud his

own thoughts—but what she could hear told her the exquisite co-ordination of the manship.

"No homing devices . . . too dangerous for them to use from a manned launcher . . . could backtrack from thermal reflection if they're not careful . . . well, look at that. . . ."

A rocket gleamed sunlight from its flanks as it sped toward them. Page tensed, the fear choking her throat as she saw the weapon swelling in size as it plunged in their direction. Even before she could see it she knew Steve-Asp had picked up the splintering of the rocket nose into a dozen jagged elements, spreading out in a cone-shaped charge intended to tear into their systems like spinning meteoroids. Suddenly that was all she could see. Her vision jarred; her back shook as the manship whipped into life.

Thrusters to her right spewed flame under maximum thrust, jerking Asp to the left. As fast as it made the move, the computer was still reading each detail of the approaching charges; the thrusters fired again, lifting them above the computed trajectory of the jagged missiles hurtling in their direction. Steve-Asp was playing it dangerously close. Was he really? To her mind, it seemed there was no way to avoid disaster. To the computer-fast, instrument-sensing systems of Steve-Asp, those deadly missiles moving toward them were relatively easy to compute and so to avoid—like a feather-weight boxer avoiding the blows of a giant who moved in ponderous slow motion.

The jagged missile chunks sped by.

Relief was short-lived as she reminded herself that there were several more adversaries out there.

The Asp danced on wings of needled flame, never still, it seemed, always waiting for the cosmonauts to commit, to expend energy and weapons and stare at this space phenomenon that seemed to defy every constraint of maneuvering

they'd ever known. The acceleration-deceleration moves slammed Page from side to side until she became dizzy and gulped in air desperately. She knew she was hyperventilating, flushing carbon dioxide from her system, that she was on the edge of passing out. She couldn't do that! If something happened to Steve and his mind blanked out under a supercharge of energy, control would pass to her and *she* would have to get Asp away from this scene.

Now Steve-Asp was no longer a spacecraft, a machine. It was a creature come finally into its own, ferociously alive, in vacuum and soaring freely on centrifugal wings.

"They've made their first move. Now it's time to give *them* something to think about—"

The manship darted to one side, shot forward, whipped sideways again. Page saw a flare of orange light blossoming from beneath their ship, spreading outward in a silent glow that faded almost as quickly as it appeared. Motes of light appeared in a vacuum . . . she stared, then understood—Steve had fired a spray of pellet-sized darts, a slow-moving swarm going at the Russians. The swarm moved so slowly it seemed they had more than enough time to fire their thrust units to evade. Which was what Steve-Asp wanted them to do.

She watched the Russians, slaves to the slow movement of their thrusters, edging away from the darts. Now Steve-Asp fired a spray of needle rockets, long strings of yellow flame fanning out like spiderwebs from the spacecraft, holding a tight pattern toward the cosmonaut on the left. She saw frantic arm movements as he pounded his controls to get out of the way, and the needle rockets tore like minuscule buzzsaws into his pressure suit, shredded it open, kept going to puncture skin and tear veins and arteries. The high internal pressure of the suit was dissipated through the multiple openings, causing a decompression that exploded the body

liquids of the man within the suit. Before she could yield to the nausea that assailed her, sudden acceleration made her almost unconscious.

The ship could move faster than any man, and the man could think faster than any machine. Reaction was to be expected from the adversary; Steve-Asp was already moving, thinking with a man's mind, thinking with a computer's and getting out of the way of what must come next.

As fast as the first blossom of fire appeared in a rounded dome of the Storm spacecraft, more flame erupted from Steve-Asp and two small rockets went on their way—not weapons. Each rocket was a fully-equipped ECM device containing an electronic signal that broadcast the "electronic image" of the American spacecraft, a far more powerful target signal than the Asp itself.

As intended, missiles erupted from the compartment of the Storm, tracking *not* the Asp but the two electronic decoys, lured away from their intended target while the Steve-Asp danced away from danger on the needle tongues of flame of its thrusters.

The game was over. The serious business of who would survive—and who would not—was at hand.

CHAPTER 22

These were experienced cosmonauts. They had flown Soyuz missions long before the Storm spacecraft was first boosted into orbit, and they had been trained for any eventuality—including direct opposition from an American spacecraft. The fact that the Asp was not in their books of known vehicles didn't deter them for long from doing what they had been trained to do: strike faster and harder.

The two men inside the Storm pressed firing studs, and a barrage of small projectiles raced away from the Russian spacecraft directly at the American ship.

Which wasn't there.

The manship had also computed the speed the Russian spacecraft needed to maneuver to fire its projectiles in a direction different from its earlier barrage. Unlike the Asp, with a swiveling launch mechanism, the Russians had to use the main thrusters of their Storm spacecraft to bring their weapons to bear. There was no way the cosmonauts and their large but relatively clumsy spacecraft could do this in any-

thing but the same ponderous motion that marked the activity of the cosmonauts in their thruster units.

Rockets erupted from the Storm, but the Asp was gone. And Page was paying a price—physical battering from swiftly changing acceleration forces. Tied in as he was to the spacecraft, *knowing* what the spacecraft would do, vastly stronger physically . . . Steve could endure much more severe physical punishment than Page in the back seat of the Asp. Still, he didn't dare consider her physical condition during his maneuvers; to do so would be to cut down his maneuvering and thereby guarantee a Russian weapon closing against the Asp.

The worst effect of acceleration was the violent starting and stopping that dangerously pooled blood in Page's body. The spacecraft would hammer from zero-g drift to cruel acceleration, and before Page could begin to adjust to the squeezing force, the force itself would be reversed as Steve threw the spacecraft into maximum deceleration. The blood that had pooled in her system was now thrown in an opposite direction—and Page began to suffer ruptured vessels and to bleed from her nose and mouth. She risked the dangers of decompression by opening the visor faceplate. Decompression wasn't nearly as immediate as choking on blood in the space between her face and her helmet. She had to get her hand inside with tissue to wipe her mouth, her lips and her nose. She did manage this, then immediately resealed her helmet. She also secured her straps as tightly as her strength would permit and increased her suit pressure to the maximum, knowing this would help restrict the movement of body fluids—especially the temporary but discomfiting pooling of blood in her extremities.

Throughout all this time the manship never stopped moving. Short, jerking motions mixed with sudden powerful

lunges kept the Russians off balance; Steve knew they could aim and launch their homing missiles only by sight. They had to be fired when the Asp was in their general line of sight to be effective. So the Storm maneuvered, jerked to and fro by powerful but insensitive thrusters, and by a control system working more on automatics than by the deft touch of a human hand.

More rockets fanned out from the Soyuz. They threw everything at the Asp—a cone-shaped barrage of jagged missiles, a launch by the cosmonaut who was still outside his ship, and two homing missiles.

Again Page was forced to take her beating, and through the blood-pounding pressure she also managed to realize that Steve was taking the measure of the cosmonauts' capabilities, trying to find out precisely what was the Russians' manned combat capability in orbit. He also knew that the Big Bird satellite, now ignored by the Storm cosmonauts, was recording it all on television and film.

And then Page knew their luck was running to its thinnest edge. From the direction of the Storm appeared two great blossoms of orange flame, two large missiles driving at them with tremendous speed, homing missiles that seemed, this time, to be impossible to dodge even with all the fancy, four-way side-stepping of the Asp.

An explosion. And Page Rossi was unconscious.

CHAPTER 23

Blackness came over her before she could understand that the manship's computing system had determined that the only hope for survival in the face of the missiles fired at them, as well as a second barrage of inert charges that kept fanning out in a buckshot pattern, was a massive change in the velocity and course of the Asp as it related to the Storm spacecraft.

Steve realized the need; realization was the same as thinking of what needed to be done, and, in his symbiotic relationship with the spacecraft, thinking of what had to be done was instantly transmitted into *doing*.

The main engine fired at full thrust; the shattering power of 200,000 pounds thrust smashed against both occupants of the spacecraft. In a machine lightened by expenditure of much fuel and weapons, acceleration was so great that Page was pushed into unconsciousness and even Steve took a fearful battering.

Yet the move was their survival. The tremendous thrust

literally exploded the Asp from where it had been to a major change in position—which also meant a time factor where the homing missiles were concerned. There was an unexpected bonus in the maneuver; the engine ignition blinded one of the incoming missiles with its flare of light and the sudden ionized cloud of the engine exhaust. To the homing system of the missile, the light-heat of ignition and the plasma cloud represented a target, and as the missile sped into the midst of the plasma the warhead exploded. Harmlessly. But not without its own blinding signature of light. This glare was picked up by the second missile, which twisted in its own flight, its slow-burning, solid-propellant motor making it a mindless thing seeking *some* target. It reached where there had *been* that blinding glare—and found nothing.

Still impelled by its thrust it swept into a wide circle, its sensor homing on the first bright object that came within its reach—the cosmonaut still in space, still using his personal thruster unit. Terrified, he now went to full thrust to escape the relentlessly closing missile, his pressure suit reflecting the light from the naked sun.

While this confrontation was still taking place, Steve fired a longer, less violent burn to kill their sudden speed. He rotated the spacecraft for deceleration, cutting their velocity and starting them back toward the Storm spacecraft and the chilling tableau of the missile homing on its human target. Page emerged from her own stupor just in time to see the frantic thrusting of the cosmonaut—the hopeless final gesture as the missile closed against the man.

Their horrified fascination at the sight nearly killed them. Their momentary diversion—Steve's as well as hers—gave Storm time to launch its final assault against them. The salty

taste of blood on her lips, Page knew that the Russians were hurling everything left in their arsenal to destroy this dancing killer before them.

There wasn't time to outrun the missiles coming at them, not this time. The moment's delay had played in the Russians' favor to that extent. Before, the enormous power of Asp's engine had snatched them away from on-coming missiles. Not now. They were being saturated. What had the Russians brought up with that Storm? Their arsenal must have comprised at least half their payload—maybe they meant to use the Big Bird for training and target practice.

Steve-Asp *flew* the spacecraft as he would a fighter plane, using thrusters as he would the aerodynamic controls of a jet fighter. He pushed the Asp into a constant acceleration. Though not so killing this time, the acceleration did pin Page against her seat. She retained consciousness, though, and was a good enough pilot to understand what Steve was doing. He was into what could be loosely described as a pursuit curve, maintaining turn acceleration to mess up the missiles. It was with some relief that she saw sunlight flash off a cylindrical body as the last of the homing missiles streaked behind them.

But even now Steve couldn't wait to find out if the Russians had anything left. The Asp was out of missiles. The small rockets were gone and its own homing weapons had been expended—the wisdom of that conversation on the ground so long ago had borne its fruit.

Steve kept watch on the Russian spacecraft as he fought through the long, thruster-jerking turn. And, as he watched, the rangefinder system in his eye, sym-linked to the Asp, provided range, lead, compensation for acceleration. Beneath them the thirteen-mm cannon suddenly came alive in a hammer of sound that reverberated through their spacecraft

with short bursts, one after the other. Page watched the flashing motes, each a shell with a small, high-explosive charge in its nose. As she watched, it all appeared in a strange slow-motion, the effect brought on by the blood draining from her head because of the acceleration-force of their turn . . . the barely visible wasps flashing through vacuum . . . the wasps snarled only with their reflections of light . . . a thin cloud of motes rushing toward Storm . . . the shells exploding into the Russian spacecraft.

Suddenly a white cloud . . . a spray of instantly-frozen gases and liquids erupting in decompression from the Storm. First cloud, then ship seemed to bulge in a hundred places . . . A huge gout of flame appeared, mushroomed outward, turning into a blossoming rose. In silence the Storm spacecraft and its men died.

Off to the side, far from them now, drifted the long cylinder of the Big Bird satellite. Page thought about the scenes it had recorded on its cameras and—

She was thrown forward against the straps as Steve cut the main engine. They were weightless again. She was in agony, captive in a symbiotic killer spaceship that had itself suffered grievous damage.

How badly they had been hit she didn't know. She did know they had survived against the heavily armed Russians. For how long . . .

There still was atmosphere below them, into which they would have to plunge at three hundred miles a minute, and build up heat from reentry friction to more than 10,000 degrees.

They had to survive this in a crippled spacecraft.

With a man who might have been separated from his senses by his linkage with a machine.

CHAPTER 24

It was time for the linkage to end. For perhaps an hour after the destruction of the Russian ship they drifted without further maneuvers. Several times Flight Control called for acknowledgment of their condition; no answer from Asp.

Page slowly regained her strength, climbing back from the depths of pain she had endured for so long. She began to realize that the symbiotic entity had probably also been affected. The ship had taken a serious blow, but she didn't know how serious; there had been no word from Steve.

She opened her faceplate, took deep breaths to clear her head. She must call Flight Control. She pressed the transmit button and started to speak. The words died in her throat. The "on" light remained dark. She tried several frequencies. Now she understood—the radios were out.

She studied the panel. The spacecraft seemed dormant. It was maintaining optimum levels on all major systems, yet was simply drifting. She looked outside the ship. For the first time she noticed the horizon turning slowly. They were in a

drifting mode. Which meant the automatic stabilizing system referenced to the horizon was either powered down or inoperative; she feared the latter. She leaned forward to get a better look at various instruments—and felt sharp pain.

Her right ankle . . . twisted. She couldn't reach it through the suit but—she loosened her harness, probed with her hand. The ankle was badly swollen, might be broken. She tried to put pressure on her foot, and had to bite her lip to keep from screaming. Somehow, during those violent maneuvers, she'd secured her harness to its tightest and had taken a severe blow—probably when Steve threw full power to the main engine during deceleration.

She had always believed that if something went wrong with Steve she'd be able to bring the ship back down into atmosphere, fly it down herself. But now, with a foot she couldn't use? With a craft that took rudder pressure, she couldn't manage with a bum leg.

She forced herself to think, and switched to intercom. She called Steve several times. No response.

The medical console. She activated the brain-wave readout.

Unconscious.

My God . . . he had been unconscious all this time they'd been drifting. How long now? Two hours? Why?

She worked the console, reading his vital signs. They seemed all right; fine, except he was unconscious.

Must have been the overloads through the sym link . . . when the ship had taken its damage Steve must have felt what was equivalent to pain. She punched in the Asp computer.

Dead.

Everything depended on getting Steve back to consciousness.

When the computer blanked out Steve must have taken an

enormous mental jolt. The two were as one—whatever damage the computer sustained, Steve felt it in his own head even though he had suffered no direct brain injury.

If so, his problem was psychosomatic—which was real enough.

Only one way to find out . . . Forcing herself to think slowly, doing her best to ignore the pain building in her foot, Page opened a sealed panel, within which lay the master sym-link override, about which even Steve hadn't known. She took a deep breath, pulled down the switch.

Steve-Asp was severed.

But Steve was still unconscious.

If she could just get him to a level of relaxed sleep. She needed more than Steve's brain working on its subconscious level. She had to bring him out of his depths, gradually. Steve's suit had to go through the sym-link disconnects. One by one she performed the operations—legs, arms, eyes, torso, fingers . . . bit-by-bit she snipped away the connections between the man and the machine.

Finally this first stage was done. The man unconscious in the cockpit before her was at least again a man. Bionics—more than man—but still a *man*. There was no machine in Steve's head any longer.

Now the stimulants. They were built into the suit. Page pressed the buttons to activate non-addictive drug stimulation. Needles stabbed Steve's neck, arm.

Now the brain . . . Page adjusted the alpha-link frequency to minimum and activated the line. The helmet Steve wore contained metal probes pressing against his skull, and these now carried an alpha-wave pattern directly to his brain. If the blow Steve had suffered in symbiosis with the computer had not been permanently damaging, Page would soon know from his brain-wave patterns.

It took twenty minutes before she saw the first

changes—and the first signs that Steve was sliding into a deep, relaxed sleep.

She closed her eyes, waiting.

Thirty-five minutes later he was in normal sleep.

They fell around the world twice more before he began to emerge from his deep well. During that period she'd had the presence of mind to power down all control systems, just in case Steve came out of his fog with a half-remembered urge to continue the fight against the enemy spacecraft.

"Page . . ."

A human voice again.

She told him everything that had happened. Then she forced him to eat a meal of high-energy rations. He was coming back to his old self. Weary, yes—but still the skilled, experienced veteran.

"You'll have to bring her back, Steve." She told him about her foot but not about the internal injuries. If he knew about them he would try to fly the easiest reentry profile to hold down any g-loads, and she knew—even if he would never admit it—that controlling the crippled spaceship was the key to their survival.

Slowly he brought the ship's systems back into power, tested them gingerly. Two thrusters were out. They were dangerously low on fuel, but there was enough for a long single burn of the main engine for retrofire.

They were in trouble without the computer and the radio. He'd have to judge by sight and by guess where to begin the re-entry, where to start slicing down into atmosphere.

He couldn't hope to pinpoint their return to the runway at Edwards Air Force Base in the California desert . . . he couldn't thread that small a needle without some sort of computer . . . but he could do it in a broadband way and punch them back into the atmosphere somewhere in the central United States. Once they were through the thermal

peak and flying again as an airplane, he figured he could land this machine anywhere.

"Check your harness," he told her. It was awful, going back to tightness the way her foot throbbed and her body ached.

They came up around the bottom of the world, Antarctica behind, South America racing below, and when he figured it as closely as he could, he fired the engine for retro. Flame ripped vacuum and the huge plasma sheath rushed ahead of them. Steve held the retroburn at minimum thrust for seventeen seconds, and Page was grateful that she merely hurt. Anything short of agony was now more than tolerable.

The sensation of weight vanished when he cut power. He brought the Asp around with the thrusters, holding the nose high, knowing they were on the way down. The ribbon of centrifugal force had been cut and gravity was starting to reclaim them.

Eleven minutes later, holding the Asp on an exact heading and attitude by use of the 8-Ball: "We've got the light," he told Page quietly; the light was on—the indication that they were in atmosphere thick enough to bring on the .05-g warning. Deceleration had begun—and so had the friction of plunging back into atmosphere at nearly 18,000 miles per hour.

As the g-forces built up, Steve brought up the nose of the Asp with the thrusters, increasing lift. The spaceship heaved itself out of atmosphere in a skip across the top of the air ocean, but in doing so they had lost several thousand miles an hour and when they started down again the punch was easier, the friction levels lower, the heat less.

Once more he let the g-forces build up, and once more he let her heave back out again, like a rock skipping across a flat pond. When he came back again it was for keeps.

With every passing moment they were in thickening

atmosphere, returning to the world of men who live under an ocean of air. The world turned into an orange glow as heat built up, radiating away, trailing an enormous plume of ionized gases behind them.

The heat lessened, the orange glow faded and Steve felt the scimitar wings grabbing air. An incredible feeling . . . the spacecraft was gone and they were again in an airplane. He powered down the thrusters, preparing for dumping all remaining fuel. They rushed earthward on a long flat glide, the U.S. spread out beneath them like a huge expanding map.

"We're more to the west than I expected," he told Page. And then he knew where he'd commit because he recognized the country rushing up at them, and in this high-speed glider there'd be no second chance without power.

He figured the real sweat was behind them now. After all, he was *flying*, and he did that pretty well. He knew they'd have company before much longer. They might have been without radio communication, but radar, he knew had been skin-tracking them. The computers were spitting out the possibilities of landing sites. Ted Anderson knew how Steve would be thinking, and would already have chase planes and helicopters in the air. Then he forced it all from his mind, dumping fuel, thereby easing their weight even more. The ship seemed sluggish to his hands, and he realized that he was missing the featherlike sensitivity of a sym-link flight. He laughed because he knew that what was most needed was skill as a pilot. There wasn't, after all, a machine or a computer ever built that could fly by the seat of its pants.

Which he could do very well.

Their speed fell steadily away and they were coming down through supersonic, the Asp rumbling from the shock waves breaking away from them. Then they were subsonic,

flying no faster than a jetliner. It was time, as they say, to fish or cut—

"Hey!" he shouted, and Page was startled, yet pleased, as she heard the exultation in his voice.

They were coming down over Utah, speeding across the range of the Pequop Mountains, reaching the first edges of the Utah-Nevada salt deserts. Great white patches on the earth, Steve knew, were isolated salt fields, each thousands of feet across, an unmistakable marker by which to judge approach.

He remembered to dump the remaining fuel and to bring down the gear. It rumbled away from its wheel wells, the doors closed, and now they were gliding with only the sound of the wind against the canopy.

Then, over a final range of high mountains, and there before them, blinding white in the sun, lay the great expanse of the Bonneville Salt Flats.

Against what they had seen from space, the salt flats yielded nothing—fourteen miles of flat surface. It was, despite everything that had happened, a stunning sight to plunge from the sky into a sea of plain white.

Off to one side the sun painfully reflected light, showing a blue-green surface that seemed to be a small sun unto itself. Steve knew he was seeing sun reflections across a salt-processing area on the edge of the flats, and looked down on what seemed enormous sheets of stained glass colored by the chemicals spread through the flooded areas.

The shifting position of the sun turned the chemicals into a huge lake of burning red, into irridescent blazing colors—red and blue and purple and green. Steven pulled his attention away and concentrated it on this final life-or-death moment rushing up at them.

He swung in a wide turn over the salt flats, trying to judge the direction of the wind, to bring her down and to

flareout. The pure salt below was so absolutely flat that from the air it was impossible to tell his height with any accuracy. Steve knew that more than one pilot had attempted to land here and had committed the fatal error of making his approach in a normal manner. It was like landing a seaplane on a lake without a ripple, covered with a glassy surface—*where there was no depth perception possible*.

Then he found what he'd been looking for—a barely visible dark line that ran straight and true for fourteen miles across the heart of the salt flats. It was the marker for the cars that accomplished the world's speed records. He still couldn't judge the wind, but he had a runway in front of him that was more than 70,000 feet in length.

Steve came around in a final turn, leveling the wings and holding a steady descent rate. Finally he quit trying to judge anything by looking outside the ship—that could throw him off completely. He flew only by instruments, holding the wings level, the nose up, guiding their path by the directional gyro. He was ready to land in this position no matter what their height. He held her off, not letting the speed get away from them, holding her steady, careful and—

A whisper. Without their knowing exactly when it happened, until that sound, until the rubber tires of Asp kissed salt and they were rolling through whiteness, they hadn't known the Asp was down.

They rushed along the sea of white, slowing gradually, knowing there was plenty of room for coming to a stop.

They stopped. Steve opened the canopy. They unhooked from the spacecraft. Hot air all around them. It was beautiful.

Steve came back, unhooking and unplugging Page. He half-dragged and pulled her from the machine. Their boots crunched on salt. They shed their heavy suits and stood

without moving, holding each other, their ears roaring with silence . . .

Nothing to hear in a limbo of pure white. Steve helped Page beneath the wing, where she could rest on the salt in the shadow of the wing. He walked slowly from the scimitar-winged shape.

The silence squeezed him, but he paid it no attention.

He stood with his head back, in the heat of a blazing sun. He also marveled at the crazy thoughts going through his head. He turned at sounds he was expecting—two jets, thunder pealing down from on high. They'd been spotted. Across the salt floor, from the mountains, he saw small dots. Helicopters.

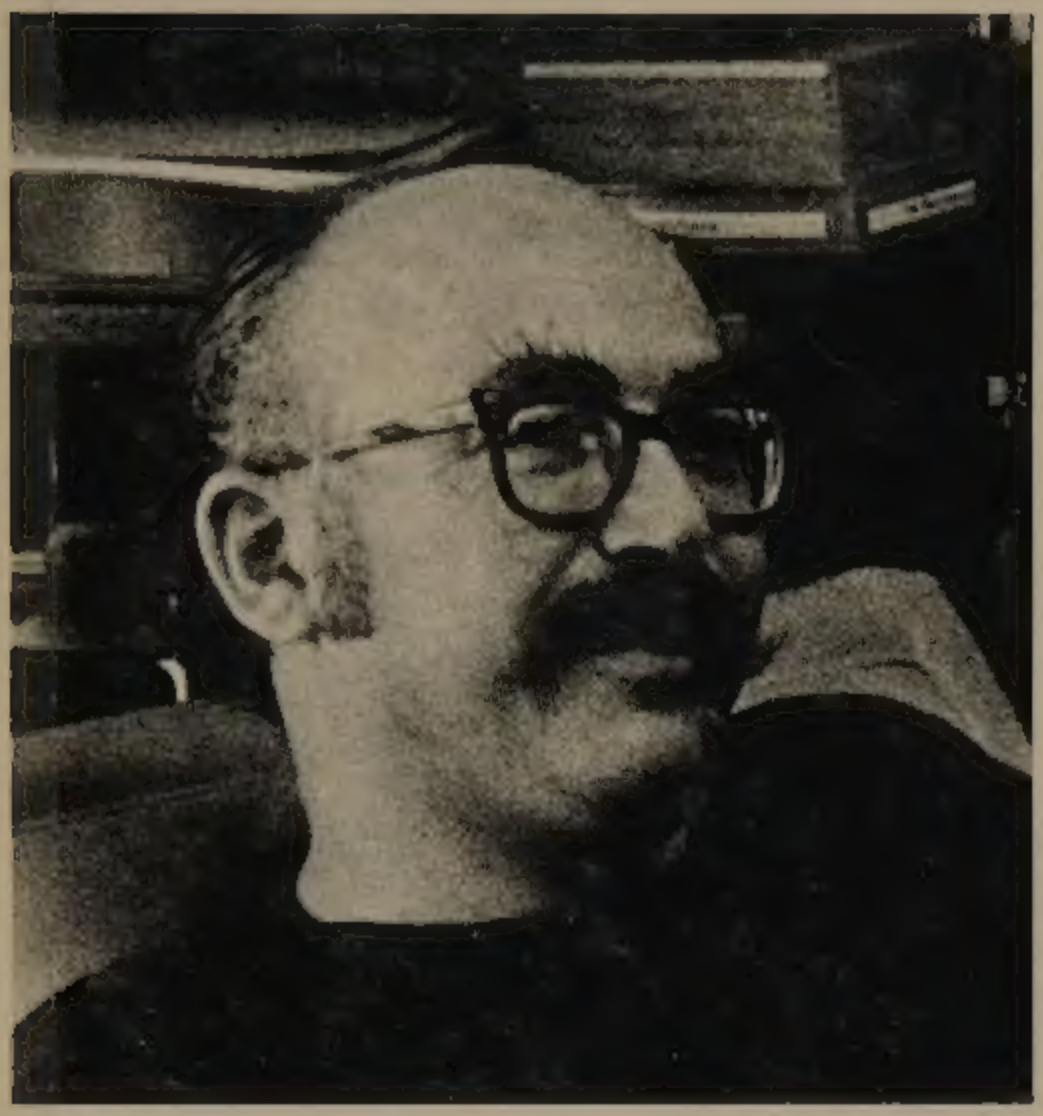
He didn't pay them much attention. He was back in orbit, thinking about the things that had happened there—especially of how the fight had proved out the sym-link.

With it, with full symbiosis . . . what *couldn't* they do?

The moon would be an afternoon trip free of earth-based computers. Mars was just around the corner, truly. . . .

He had flown in vacuum. Why not to other worlds?

Why not?



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